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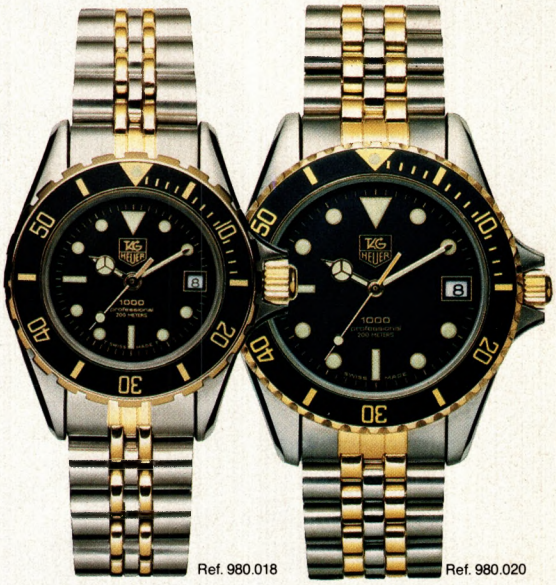
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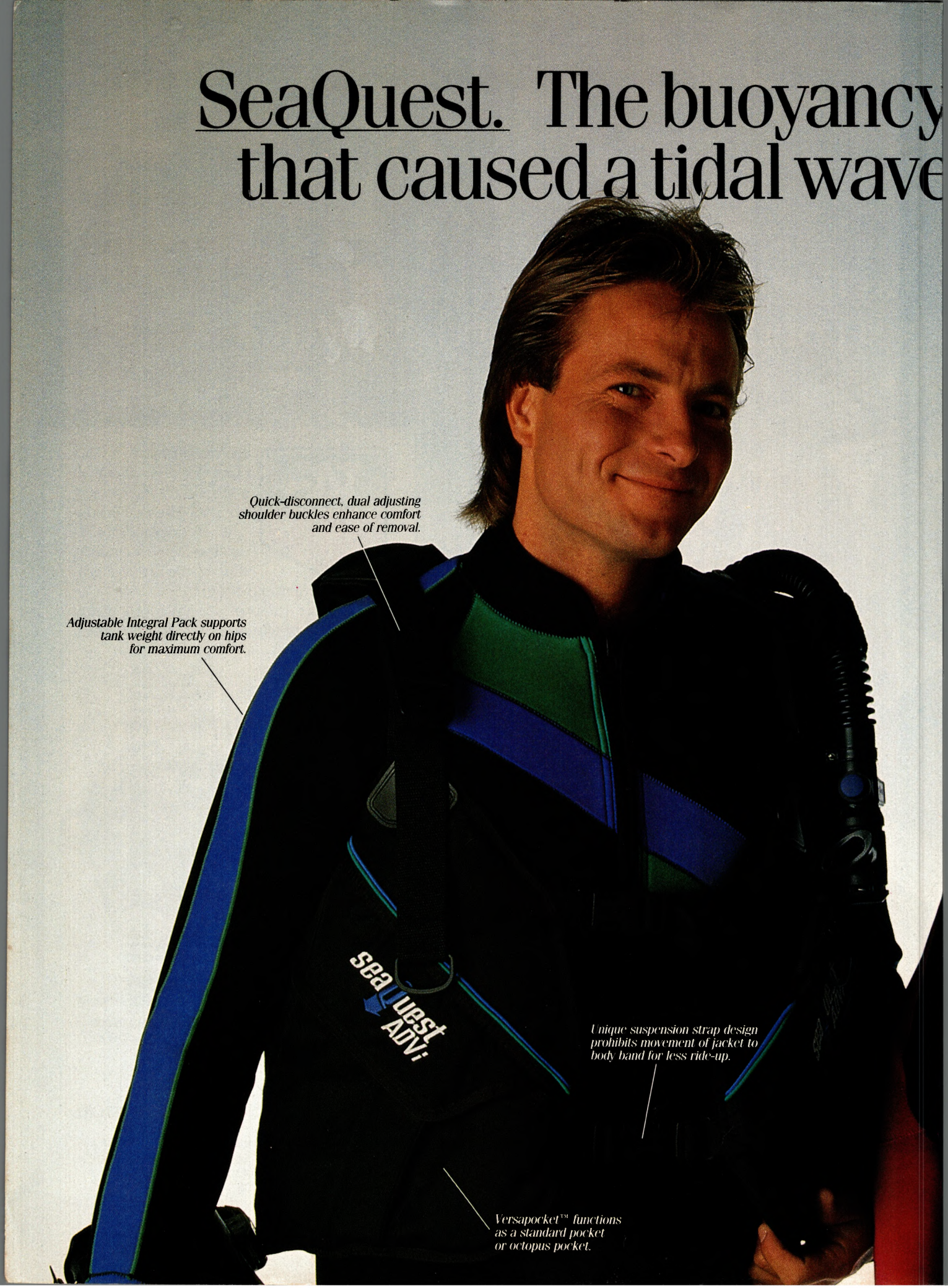
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SDM

Volume Thirty-six *Number Two*

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COVER

Grand Cayman divemaster Anne Davis views a double vase formation of red sponges growing on Cayman's famous North Wall. For more on Cayman above and below the water's surface, see page 53. Photo/Geri Murphy.

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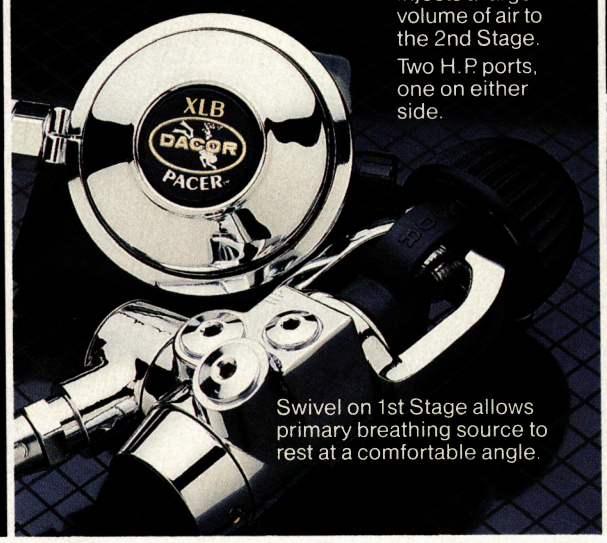
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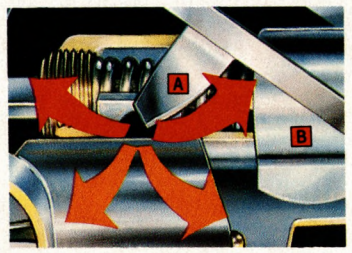
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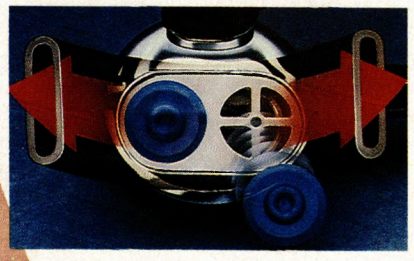
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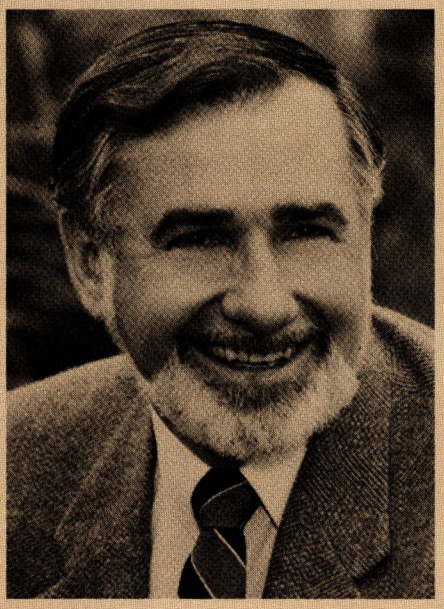
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SDM Editorial

BY PAUL J. TZIMOULIS



DOWN TO THE SEA IN SHIPS

The dive travel industry is witnessing an almost explosive growth in live-aboard dive boats. It started two years ago. By the end of 1987 the number of live-aboards will have doubled! They are popping up in just about every tropical resort area around the world.

The trend seems to be going in two different directions—small craft and large live-aboard vessels. The smaller live-aboards are generally mom and pop operations equipped to handle four to six divers and a crew of two. The large live-aboards are ultra modern, metal hulled ships that can handle 16 to 20 divers and offer more spacious accommodations and a greater number of services.

Why this sudden increase in live-aboard dive boats? There are several reasons and most of them reflect current economic trends. The availability of low interest financing has made it possible for many diving entrepreneurs to enter this burgeoning field.

The world oil glut has practically shut down offshore oilrig development. This trend has resulted in a large market of surplus crew boats that can be easily and inexpensively converted into live-aboard dive boats. The end result is a million dollar floating dive resort. While $1 million may sound like a lot, it is certainly less expensive than attempting to build a $5 million resort hotel on an expensive piece of beachfront property. The conversion of a steel hulled crew boat is cheaper and much faster.

Yet the most important reason for the growth of live-aboards is the prospect of increasing consumer demand. As more and more new divers head for the tropics, the demand for dive resorts continues to increase. In addition, a large segment of current divers is now more experienced at dive vacation travel and appears to be seeking advanced level trips.

SDM recently conducted a survey of its readers to determine the new attitudes toward live-aboard dive vacations. We found the past market for live-aboard vacations has been small and that only 15.2 percent of the readers had taken live-aboard trips. However, a whopping 56.3 percent of those surveyed said they would like to try a live-aboard vacation in the near future. This could mean 50,000 more divers will be booking live-aboard vacations in the coming years.

Why the sudden interest in live-aboards? In the same survey we found 54.6 percent of SDM readers indicated "unlimited diving" is one of the major attractions. Interviews with live-aboard customers indicate they average from three to five dives per day. Hardcore types make as many as six dives per day, just about double the number possible at most land based resorts.

The second greatest attraction appears to be the opportunity to dive exotic or otherwise inaccessible sites. These virgin reefs or wrecks are beyond the reach of land based operations or are in areas where there are no land based resorts. Other attractions include less hassle with dive gear, flexible meals, personalized service, flexible dive routines and an opportunity to make new friends.

Does the boom in live-aboards spell the end of island resort hotels? Not by a long shot. At this point only one out of six vacationing divers goes onto a live-aboard. Most divers still seek the luxury of a spacious resort and the excitement of island night life. This is especially true of new dive travelers.

Live-aboard life is not for everyone and should be regarded as an advanced dive travel experience. There are many tradeoffs you must be prepared to accept. The advantages are offset by an equal number of shortcomings.

Confinement appears to be the most notable sacrifice. Accommodations (cabins) are much smaller and there is less closet space and storage area. Departure and arrival times are somewhat restricted. Once you board the vessel, you are there for the duration of the cruise.

While the food on live-aboards is often superb, the dinner menu is usually limited to one or two entrees. People who are fussy about what they eat might find this lack of selection disappointing. There is, of course, less privacy onboard a boat. Communal showers and toilets are an accepted part of life. For those who may be seasick prone, the live-aboard vacation may not be a viable option. Although these boats try their best to anchor in protected waters, things can get bumpy.

Before you sign up for a live-aboard vacation, carefully weigh the advantages and disadvantages. The choice is a personal one that only you can make. If you are unsure about the live-aboard life, select a short cruise of seven days, rather than a 10 or 12 day voyage. Another way to test the waters is to book a vacation with half the time on a live-aboard and the rest of time at a beach resort. This approach is becoming a popular choice for even veteran live-aboard travelers.

Another tip for novices is to book your trip on one of the new generation of large, converted oilrig boats. These craft offer much more spacious cabins, dining areas, dive gear storage and so on. They feel a lot more like mini hotels than boats. It is a good way to start.

Last but not least, shop carefully by asking a lot of questions and reading the fine print in the advertising literature. Make sure your personal needs will be served on the live-aboard trip you choose. If you pick the right one, it can be a thoroughly enjoyable experience.

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Diver's Calendar

DMT COURSE

A Diver Medical Technician course will begin **February 3** in Seattle, Washington. Offered by LifeTek, Inc. in conjunction with Virginia Mason Hospital Hyperbaric Division, the 160 hour course is for the professional diver and is approved by the National Association of Diver Medical Technicians.

For more information, including entrance requirements, call Ron Rutherford at (206) 823-8229 or Richard Dunford (206) 583-6543 or write LifeTek, Inc., 12020 Juanita Drive NE, Kirkland, WA 98034-3431.

CATALINA ISLAND PHOTO COMPETITION

The Underwater Photographic Society of Northern California and the Blue Dolphin House of Avalon will host the first annual Catalina Island Underwater Photo Competition **February 6-8** in Avalon. Contestants shoot one roll of film on Saturday and submit their entries on Sunday. The registration fee includes two nights' lodging, Saturday dinner, Sunday brunch, film and developing, use of tank and weightbelt. For information contact Nanci Davis, P.O. Box 2605, Avalon, CA 90704; telephone (213) 510-1811.

SHIPWRECK PHOTOGRAPHY COURSE

Maritime Research Limited will present a one day class in specialized techniques of photography for shipwrecks and U/W archaeology **February 7** in Aurora, Colorado.

For information call High Country Divers at (303) 341-5735.

DESERT DIVERS BANQUET

Clive Cussler, author of *Cyclops*, *Raise the Titanic!*, *Deep Six* and many other bestsellers, will be the guest speaker at the 16th annual Antelope Valley Desert Divers banquet **February 7**. The event will be held at the Desert Inn in Lancaster, California and will begin at 7:30 pm. For information and reservations contact Walt Schob, (805) 273-4568.

ST. PETERSBURG SHELL SHOW

The St. Petersburg Shell Club, Inc., will present its 40th annual Shell Show **February 13-15** at the Community Center, 1 Park Place at 106th Avenue, Treasure Island, Florida. For information contact St. Petersburg Shell Club, c/o Barbara Ferguson, 6950 46th Ave. North, #51, St. Petersburg, FL 33709.

AQUARIUM SHOW/ PHOTO COMPETITION

The Marine Aquarium Society of the Palm Beaches will present its 18th annual Aquarium Show and Photographic Competition **February 19-22** at the Cross County Mall in West Palm Beach, Florida. The photo entry deadline is February 12.

For information contact the Marine Aquarium Society, c/o Gene A. Crease, 12368 Hillman Drive, Lake Park, FL 33410; (305) 626-4622 or Scott Blount, 4549 Empire Way, Greenacres, FL 33463; (305) 964-3102.

SARASOTA SHELL SHOW

The Sarasota Shell Club will host its 24th annual Shell Show **February 20-22** at the Sarasota Exhibition Hall.

For more information contact June Bailey, 813 Bayport Way, Longboat Key, Florida 33548; (813) 366-1550.

UNDERWATER OLYMPICS

The Racine Scuba-Do's are hosting an Underwater Olympics to benefit the Divers Alert Network at Racine Case High School, Racine, Wisconsin **February 22**. Underwater hockey is the main event and the grand prize is a trip for two to the Cayman Islands.

For information contact Scuba-Do's, 3405 Douglas Avenue, Racine, Wisconsin 53402; (414) 639-9344.

SEAS '87

Jack McKenney and T. Walker Lloyd (consultant to Rolex Watch) will headline the Seas '87 film festival in Raleigh, North Carolina **February 27-March 1**. This year's event will feature artifacts from the famous *Atocha* wreck as well as seminars.

For information contact Seas '87, P.O. Box 31186, Raleigh, NC 27622; (919) 781-0559.

BOSTON DIVING SHOW

The 37th edition of the Boston Diving Show will be held **February 28** at the Boston Park Plaza Hotel, Boston, Massachusetts. The event includes daytime exhibits and seminars and an evening film show. Proceeds from the show will go to the Divers Alert Network.

For information contact Fred Calhoun, P.O. Box 291, Back Bay Annex, Boston, MA 02117; (617) 944-4785.

SEA ROVERS CLINIC

The Boston Sea Rovers will present their 33rd annual Underwater Clinic in Boston, Massachusetts **March 7**. The nighttime program will be held at John Hancock Hall and a meet the speaker party will follow. T. Walker Lloyd, oceanographic consultant to Rolex USA, will be MC and Dr. Robert Ballard, chief scientist at Woods Hole Oceanographic Institution, will be the featured speaker.

The daytime program will be held at the Copley Plaza Hotel. There will be many exhibits. For information contact Bunky Hodge, 174 Beech St., Rockland, MA 02370.

CALIFORNIA PHOTOGRAPHIC COMPETITION

A Nikonos 20mm lens is the best of show prize in the first annual California Photographic Competition sponsored by the Channel Islands Underwater Photographic Society. Categories include prints and slides in macro and wide angle, but these photos must have been taken in California. Winning photos will be presented at the CI UPS film festival **March 7** at the Port Hueneme Cultural Center. Jack McKenney is MC for the event.

For information contact Jim Perry, Channel Islands Underwater Photographic Society, P.O. Box 6901, Oxnard, CA 93031.

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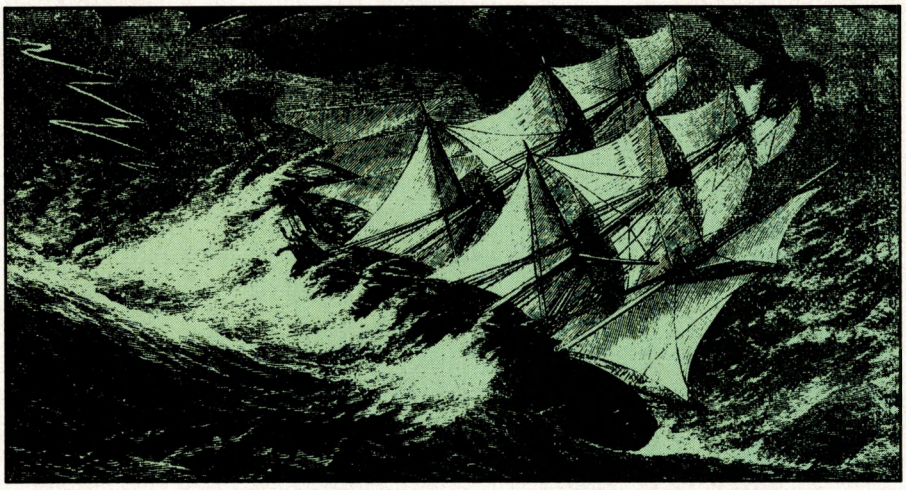
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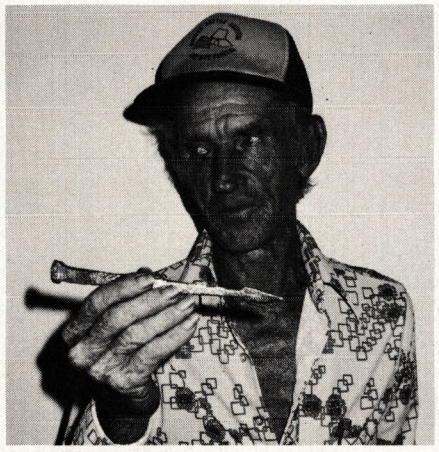
Wreck Facts

BY ELLSWORTH BOYD

Gene Chevalier and the silver spikes. If you think this sounds like an adventure story, you're right. It's a true treasure tale that makes me want to cast everything aside and head south to try my luck on a sunken galleon. Chevalier, who has been tracking treasure on land and underwater more than 50 years, has searched the Caribbean, South America, Central America and Mexico. But, none of his discoveries matches the novelty and appeal of the silver spikes. He found 11 of them, each approximately eight and one-half inches long and weighing seven ounces. They came from a Spanish galleon of early 1600s vintage, wrecked in shallow water off Palm Beach County, Florida. Chevalier used the technology of the early days—Ping-Pong paddles and swim fins—to retrieve his treasure! "We just went down and fanned the sand with paddles," Chevalier recounts while relaxing in the home of Florida historian, Kay Stowell. "If we didn't have a paddle, we'd use a flipper. This was the method in the old days when we didn't have all the fancy new gadgets."

The origin of the silver spikes is what makes Chevalier's story so appealing. The Spanish used bell metal—molten brass and bronze—to forge spikes and nails. But, on this occasion they ran out of it and had to melt silver for spikes used to patch holes in the ship's hull. First the Spanish careened the ship; then they melted the silver and poured it into sand molds. The finished product was a spike with a square head and sides, tapering to a point that resembles an arrowhead. "It was like pounding square pegs in round holes," Chevalier says, "but it worked. The wood swelled up behind the points and the spikes wedged in tight. As for using silver, the Spanish didn't care—they had plenty of it." Chevalier sold a few of the spikes years ago for $350 each. Collectors now offer more than $1,000 apiece for them, but they are so rare Chevalier refuses to sell any more. The veteran salvor says he thinks there are more spikes and treasure still on the wreck, but storms have buried it beneath ten feet of sand. "That's where the new gadgets might come in handy," he says. "The days of Ping-Pong paddles and flippers are just memories." But, they are fond memories and the lure of the silver spikes remains a fascinating saga in the modern day quest for sunken treasure.

Treasure buffs will be enthralled with Duncan Mathewson's book, *Treasure of the Atocha*. The 160 page hardback was written by the man who was directly responsible for targeting the site of Mel Fisher's $400 million discovery off Key West, Florida. Mathewson, Fisher's archaeological director, documents the intense search and discovery of the galleon and reveals the behind-the-scenes story of the gold, silver, precious stones and historic artifacts recovered from the wreck. He explains the techniques used to disclose new details about 17th century Spanish colonial life in the New World. More than 80 color photographs depict the treasure and the techniques used to recover it. The publication is available from Pisces Books, One School Street, Glen Cove, NY 11542 for $24.95 plus $3.50 postage and handling.



photo/Ellsworth Boyd and Kay Stowell

Gene Chevalier with a silver spike

Larry Pratt, Medina, New York, writes that he and several buddies have been diving a wreck they believe to be the *E.A. Roe*. Lost in 1889 on a rocky reef near Braddock Point, Lake Ontario, the *Roe* is reported to be a schooner. (Braddock Point is ten miles west of Rochester, New York.) When the divers decided to explore an area approximately one-quarter mile east of the *Roe*, they discovered the wreck of an old steamer. Larry says they found a boiler, a piston rod, pieces of the hull with ribs crossing in both directions and iron plating that covers wooden planks. If you know anything about this wreck, please contact Larry at 214 James Street, Medina, NY 14103.

Captain John Gilbarty, Jersey City, New Jersey reports on the raising of a 90 foot paddleboat from the Hudson River, Hoboken, New Jersey. Used as a floating restaurant, the *Drifters I* remained on the bottom in 30 feet of water for seven months before the Don John Construction Company moved a crew of 14 and a crane into place for the salvage attempt. Divers jetted mud from beneath the wreck and slipped heavy cables around its hull. When the crane raised the vessel, workers hosed off the thick black mud that covered the ship from bow to stern. *Drifters I* was built in 1931 and served as a shuttle between Welfare Island and Manhattan for many years before it was converted to a restaurant. Raising the wreck cost approximately $100,000.

Mike Kohut, Royal Oak, Michigan tells about a reporter and cinematographer from channel seven's Good Afternoon Detroit show and their dive on Lake Huron's ghost ship, the *Charles S. Price*. Paul and Barbara Postill, who handle the charter boat, *Bottom Time*, took Todd Hissong and Gary Gowman ten miles north of the Blue Water Bridge in Port Huron where they tied to a buoy that was anchored in 70 feet of water. Accompanied by safety diver Susie Kushner, the writer and cinematographer made the dive and successfully explored and filmed the 524 foot ore boat. Hissong was fascinated by the demise of the *Price*, one of eight ships lost on Lake Huron in the 1913 "storm of November." An 18 hour gale sank all eight vessels, now called the Ghost Fleet of the Great Lakes. It is believed the *Price* collided with the packet freighter *Regina*, also a victim of the devasting storm.

Great Lakes divers might be interested in Fred Stonehouse's new book, *A Short*

(Continued on Page 133)

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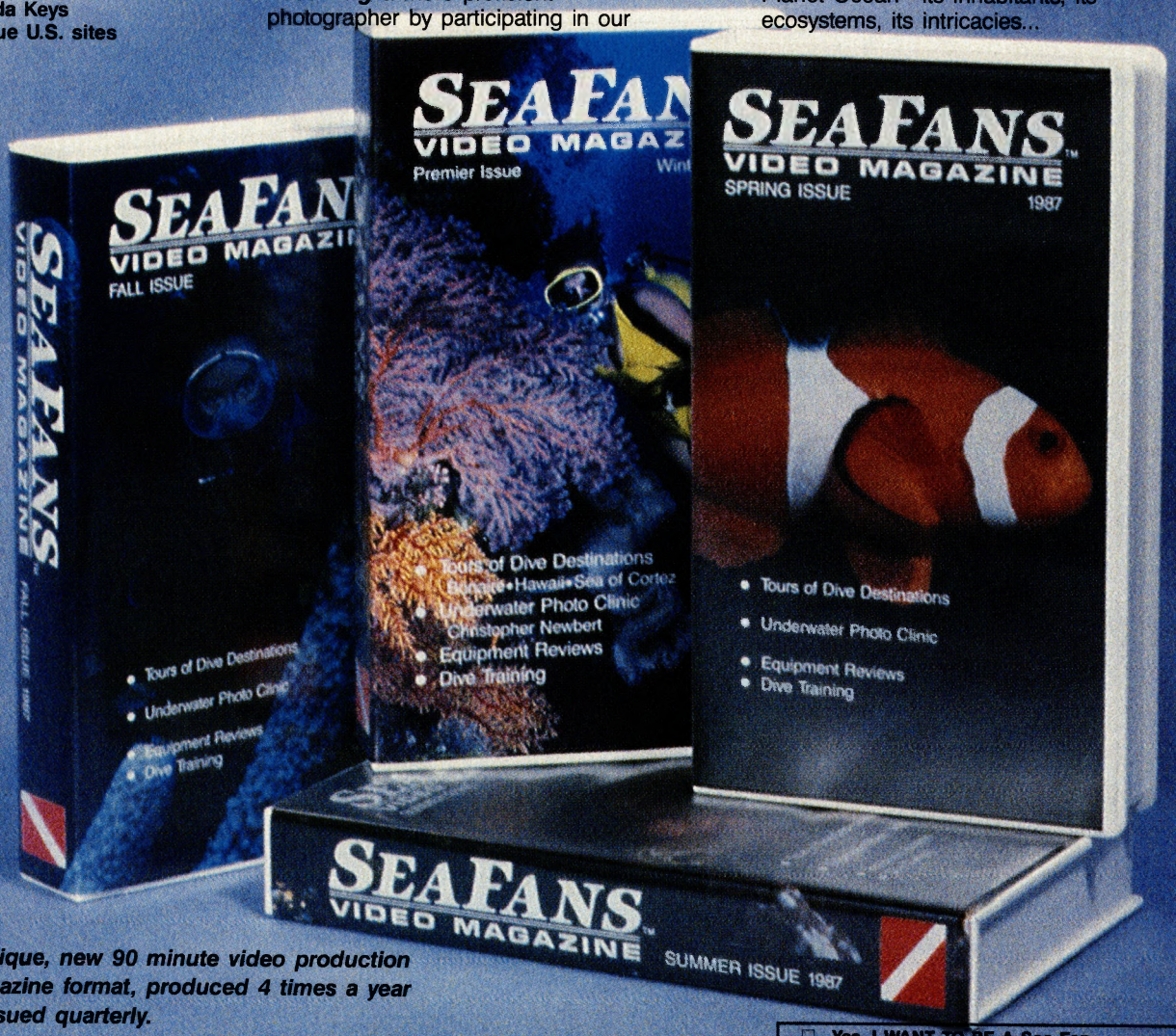
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Scuba Quiz

Category: Diving Safety

Topic: Area Orientations

By Dennis Graver

It is common for divers to travel from place to place to pursue their interest in the underwater world. What should they do to become acquainted with new areas? How can they obtain an orientation to diving in a different environment? Is an orientation essential? Compare your thoughts and feelings with the information in this month's quiz. The answers are on the next page.

1. The primary objective of an area orientation is to:
- ☐ A. Make diving safer
- ☐ B. Make diving more enjoyable
- ☐ C. Learn where the best diving is
- ☐ D. Become familiar with the hazards

2. A certification for diving qualifies one to dive:
- ☐ A. In the same type of water in which trained, e.g., fresh.
- ☐ B. In the type of conditions in which trained
- ☐ C. Anywhere under favorable conditions
- ☐ D. Only in the area in which training occurred

3. Benefits of area orientations include:
- ☐ A. Learning about good dive sites
- ☐ B. Learning to avoid potential problems
- ☐ C. Meeting potential dive buddies
- ☐ D. All of the above

4. Additional benefits of area orientations include:
- ☐ A. Familiarization with laws and regulations
- ☐ B. Getting answers to questions
- ☐ C. Learning about aquatic life
- ☐ D. All of the above plus more

5. Area orientations deal with environmental diving conditions, not with diving techniques.
- ☐ A. True
- ☐ B. False

6. Which of the following activities is not a requirement for an area orientation dive?
- ☐ A. A check of fundamental diving skills
- ☐ B. Identification of aquatic life
- ☐ C. Familiarization with water movement
- ☐ D. Entry and exit procedures

7. An area orientation should consist of:
- ☐ A. A slide show, a briefing, a dive, a debriefing
- ☐ B. A briefing, at least two dives and a debriefing
- ☐ C. Two briefings, at least two dives and two debriefings
- ☐ D. None of the above

8. Which of the following may be included as part of an area orientation dive?
- ☐ A. A check of basic diving skills
- ☐ B. A buoyancy check
- ☐ C. Credit toward a diving environment specialty rating
- ☐ D. Any or all of the above

9. Area orientation dives are usually:
- ☐ A. Provided as a community service by dive clubs
- ☐ B. Provided at no cost by local divers
- ☐ C. A professional service
- ☐ D. Combined with local training dives

10. It is best to arrange area orientation dives in advance, with or through:
- ☐ A. Diver training agencies
- ☐ B. Dive clubs
- ☐ C. Dive stores or resorts
- ☐ D. Diving instructors

11. Arrange in order of preference from most to least desirable the following means of orientation:
- ☐ A. Local divers
- ☐ B. A diving instructor
- ☐ C. A professional dive guide
- ☐ D. Books

12. Which of the following is of greatest importance during an area orientation?
- ☐ A. Exposure factors (sun, cold, etc.)
- ☐ B. Hazardous life
- ☐ C. Area hazards
- ☐ D. Water movement

13. Area orientations are needed until which of the following ratings has been achieved:
- ☐ A. Advanced scuba diver
- ☐ B. Divemaster
- ☐ C. Instructor
- ☐ D. None of the above

14. Complete: When I travel to an area I have never dived before, I _____ get a formal orientation to diving in that area.
- ☐ A. Always
- ☐ B. Usually
- ☐ C. Seldom
- ☐ D. Never

15. True or false: The more experience a diver has, the less value area orientation dives have.
- ☐ A. True
- ☐ B. False

Scuba Quiz

Answers: Area Orientations

1. A. Make diving safer. All of the answers are correct, but A is the most correct. When you are safe, you are able to enjoy yourself. You will feel more confident and at ease. Enjoyment is the goal. Safety is the means toward that end.

2. D. Only in the area in which training occurred. B is not a good choice because while conditions may appear similar, there can be great differences from area to area. While you may be able to dive in many areas, it doesn't mean you are *qualified* to dive in them.

3. D. All of the above. There are positive reasons for getting orientations as well as the serious ones such as safety. You can frequently meet others who are visiting an area and learn the very best locations for diving.

4. D. All of the above plus more. It should be obvious that orientations are not only needed, but valuable. You may have an unpleasant experience without an orientation. Have fun and avoid problems.

5. B. False. Area orientations deal with the diving techniques needed in an area owing to environmental conditions. A good example is entry and exit techniques, which vary greatly from one place to another.

6. A. A check of fundamental diving skills. While a skills check may be included in an orientation dive, such a check is not required and often not included. Refresher training should be requested if it has been awhile since you have been diving.

7. D. None of the above. You can give yourself credit if you chose C, however. The concept is that one dive is not enough. You need time to digest the experience, get questions answered and apply what was learned from a previous dive under supervision. The more dives you can make under supervision, the better.

8. D. Any or all of the above. You can arrange to include refresher training as part of your dive, but the guide needs to be an instructor. A buoyancy check should be included if there is any change in the equipment being used or in the density of the water. Since you are learning about the environment, you can get credit for an U/W environment specialty dive or an international diver rating.

9. C. A professional service. A proper orientation dive requires the time of a professional and that person should be compensated. Use a professional to get the best possible service and budget for it when you plan your trip. The cost is usually quite reasonable.

10. C. Dive stores or resorts. This is the best option because the services will be professional and available on a regular basis. Training agencies can refer you to the facilities in an unfamiliar area.

11. C, B, A, D. A professional dive guide is actually better for orientations than an instructor because the guide will usually have more experience diving the local sites. Area instructors are an excellent alternative, however. Any orientation is better than none at all, but seek out a professional one whenever possible.

12. D. Water movement. Divers are often concerned with hazards such as dangerous life forms and underwater obstacles, but currents, riptides and surf conditions present more serious problems. Ask lots of questions about water movement when diving a new area.

13. D. None of the above. There is no level of training at which an orientation is no longer required. Even after diving all over the world, an instructor still needs to know what to look out for in a new area.

14. A, B. Give yourself two points if you answered A, one if you answered B and none if you answered C or D. Orientation dives are not just a good idea, they are strongly encouraged.

15. B. False. The more experienced one becomes, the more apparent the value of an orientation. Seasoned divers develop respect for varying environments and are not bashful at all about asking questions regarding local procedures.

Orientation dives are not widely advertised or promoted, but are available upon request from most professional stores and resorts. If you scored well, congratulations. If you didn't do too well, I hope you are impressed with the value of this topic. Do yourself and your dive buddy a favor on your next trip by making arrangements in advance for a professional orientation. Your trip will be more rewarding and enjoyable.

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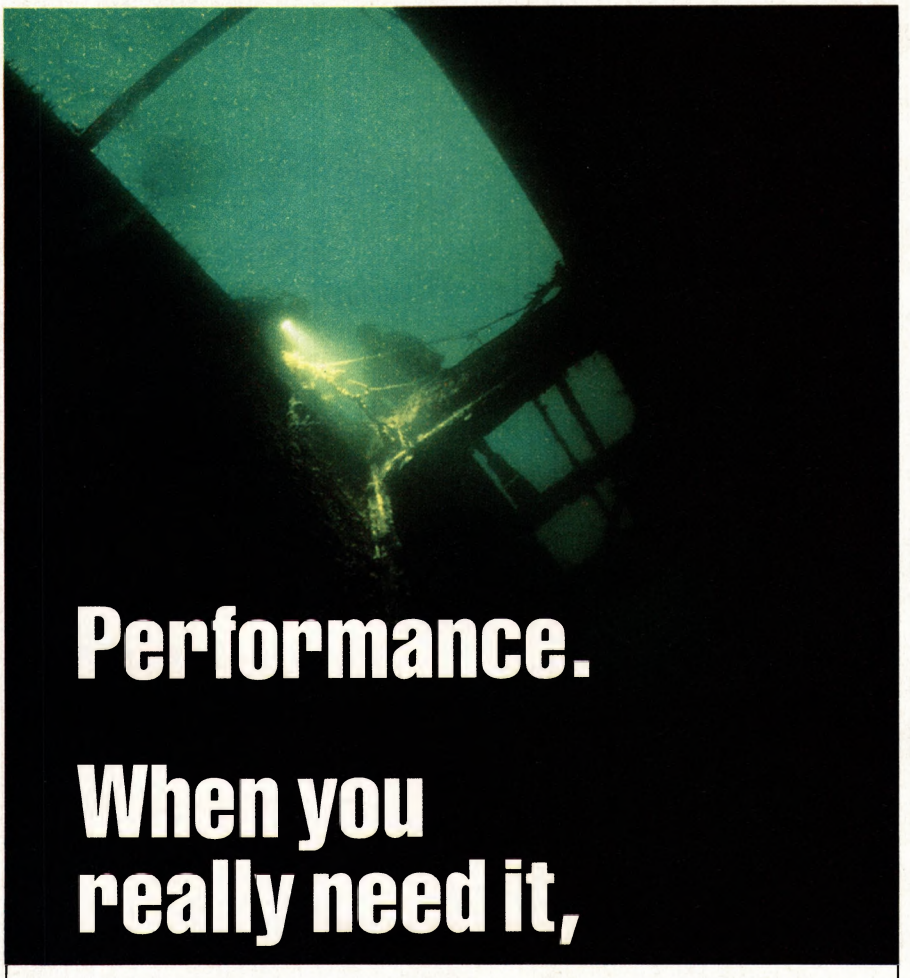
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STEWART HONORED

Jim Stewart, diving officer for UCSD's Scripps Institution of Oceanography, has received two prestigious diving safety awards. He is the recipient of the Craig Hoffman Memorial Safety Award from the Undersea Medical Society and the Leonard Greenstone Award from the International Conference on Underwater Education and the National Association of Underwater Instructors.

The Hoffman Award is presented for continuing leadership in development of diver safety, training techniques and standards. It was established in 1977 by Andre Galerne, president of International Underwater Contractors, as a perpetual commemoration for Craig Hoffman, a young diver who died in the North Sea.

The Greenstone Award, presented at the International Underwater Education Conference in Miami, Florida, was also given for Stewart's outstanding contributions to diving safety. It was presented by John Wozny, NAUI board of directors and awards chairman.

As a diving instructor and former Navy diver who saw the need to recognize leadership in diving safety, Leonard Greenstone originated the perpetual trophy in 1974.

Stewart, a marine botanist, has been associated with Scripps since 1952. As diving officer since 1960, he heads the nation's oldest and largest non-governmental research diving program. He has been diving for more than 43 years and has been exposed to most types of equipment and practices.

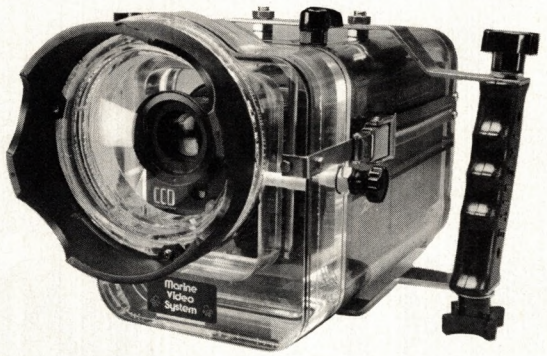
In the early 1960s, he developed the original University Guide for Diving Safety, which created a means for establishing reciprocal diving programs throughout the University of California system. He has managed the Scripps Research Diving Program, which has become the model for safe and effective conduct of international research diving programs. He has supervised a yearly average of 130 faculty, staff and students who have amassed more than 100,000 dives.

BERTOZZI/SEAQUEST

SeaQuest has appointed Carlo Bertozzi to corporate strategic planning and business consultant. A Harvard business graduate, Bertozzi has been president of Alcort Sailboats, Connecticut, and Mares of Rapallo, Italy.

Bertozzi will be analyzing both internal and external systems to aid SeaQuest in maintaining its growth within the diving industry. In addition, some of his time will also be involved with other SeaQuest/Suunto operations in North America.

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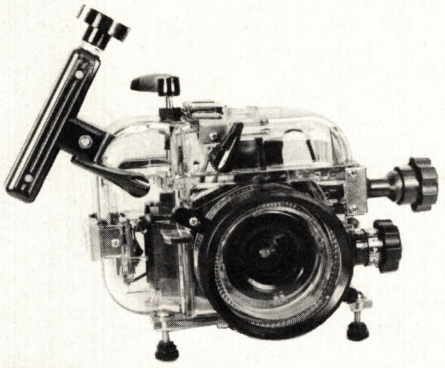
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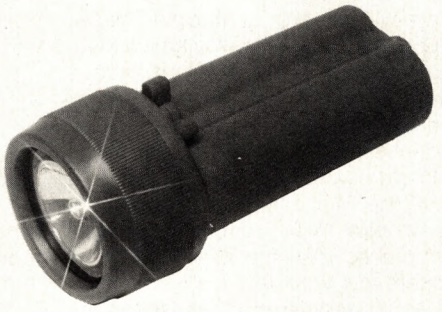
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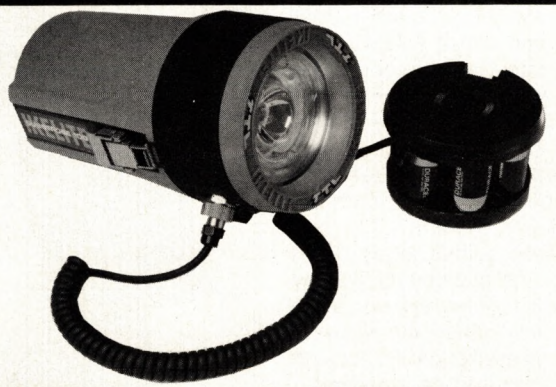
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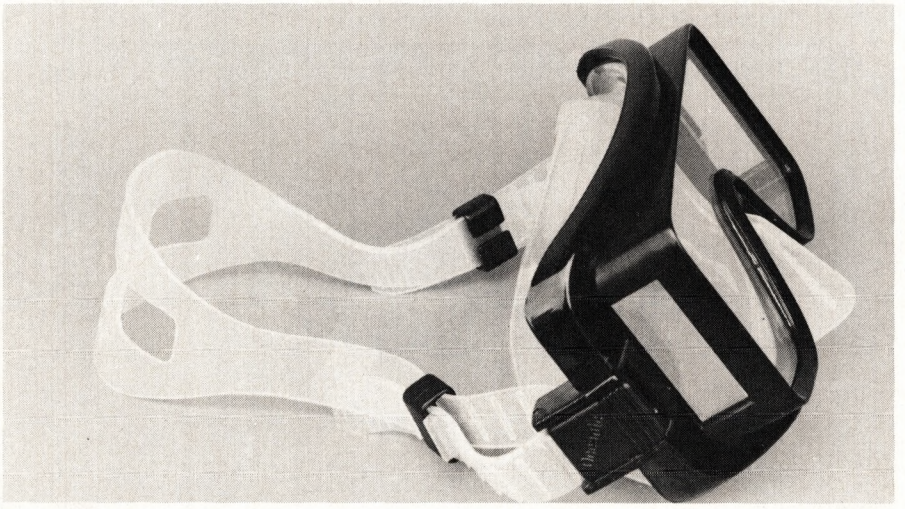
BY JIM WALKER

Some people are just never satisfied. A little over a year ago I reported on the Silicone Prismatic II mask from Oceanic. In that report I described the mask as offering nearly 180 degrees of view side-to-side and top-to-bottom while maintaining relatively small size and low volume. You can hardly ask for more than that. Yet, someone must have, because Oceanic now offers two versions of the Prismatic—the new one is called the Mini Prismatic.

Divers with smaller or narrower faces will appreciate the Mini Prismatic. Measuring only five and one-half inches across the frame, it has gone the typical mini-mask one better by offering a deep (three inches), one piece lens augmented by twin side windows. As with the Prismatic II, the Mini offers nearly 180 degrees of view in two dimensions. And, even more so than the Prismatic II, the Mini offers low volume.

The Mini's tempered glass lenses are set in an opaque black ABS plastic mini-frame that is sealed into a larger, translucent polycarbonate outer frame. This outer frame is curved to fit closely around the face, yet is held away from it by the mask skirt. Thus, there are no pressure points to create discomfort. This dual frame arrangement also allows the lenses to be positioned close to the eyes—again for low volume and wide view. To coordinate with your snorkel or other dive gear, the outer frame is available in blue, lavender, pink, red or aqua.

The Mini's skirt is made of silicone rubber and features a double face seal and nose pocket. In addition to being hypoallergenic, the clear silicone rubber allows more light to enter the mask and illuminate the face of an underwater model.



The Mini Prismatic features a clear silicone skirt with nose pocket, large one piece lens and twin side windows. The frame is anatomically curved to fit close to the face.

And, even better, silicone won't break down from exposure to sunlight, ozone, etc.—but keep it away from black rubber products, which can cause yellowing.

The Mini Prismatic has a silicone rubber strap with a wide, slotted center that will help keep it in place on the diver's head. Ridges on the strap, combined with the spring loaded locking tab, keep the strap from slipping out of adjustment (Oceanic's Mask-Lok system).

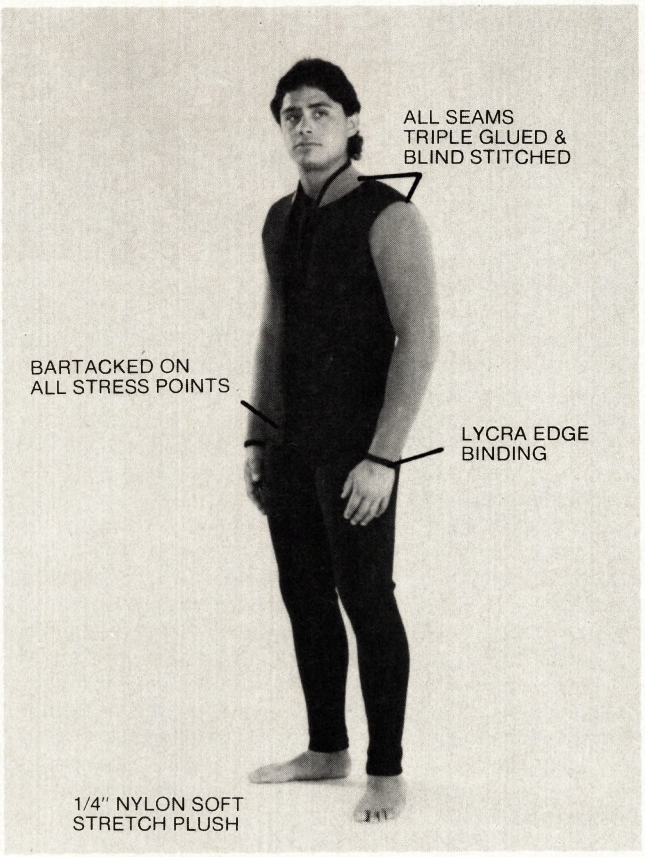
With black plastic guides to pin down loose strap ends, the buckles allow easy adjustment. Topside or underwater a tug on a strap end will tighten the mask fit and, if overtight, pressing on the locking tab will allow the strap to be loosened.

The Mini Prismatic mask retails for $75. If you want a mini mask with a maxi view, try one on at your Oceanic dealer. For dealer information contact Oceanic USA, 14275 Catalina St., San Leandro, California 94577-5589.



photos/Bonnie J. Cardone

The Mini's band can be quickly adjusted: Pulling on a strap end will tighten the mask and pressing in on the spring loaded locking tab allows loosening the strap.





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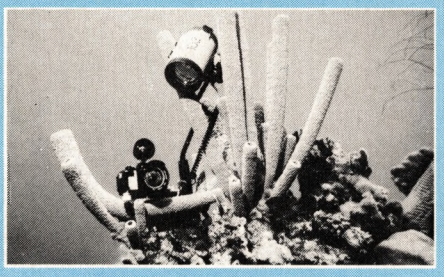
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Nikonos Shootout '87

Where And When

TEXT AND PHOTOGRAPHY BY BILL GLEASON



Last year SKIN DIVER Magazine called the 1986 Nikonos Shootout the "most unique, exciting and best diving event of the year." So many divers echoed our sentiments that Nikon is planning to make the Shootout an annual event with more than $60,000 in prizes. The 1987 Nikonos Shootout has been expanded and improved and U/W photographers, regardless of experience level, ought to give serious consideration to entering.

The contest is simple. Nikon says all you have to do is "sign up, show up and shoot 'em up." Here's what that means: First you pick the tropical island you'd like to visit—Cayman, Bonaire or Cozumel. (The Shootout is offered during the first week of May on Grand Cayman, the first week of June on Bonaire and the second week of July on Cozumel.) Then call the Shootout Hotline toll free and register. That's all you need to do to sign up and it's the last thing resembling work you'll do for the entire vacation.

The next part is easy—show up. Enjoy your vacation on one of the three islands. Kick back, order a tropical drink and turn up the Jimmy Buffett tunes on the stereo. This is not an intense, uptight, super contest. It's a vacation with a lot of fun things to do, with the added bonus that $60,000 will be distributed to the photographers who take the best underwater photos during the Shootout.

Now that's something to think about while you're sipping that drink. The grand prize is a trip for two, courtesy of See and Sea and Qantas, on a luxury live-aboard dive cruiser to the Coral Sea—plus Nikonos equipment worth $3,000. First prizes (eight will be awarded) offer a week for two on Cayman, Bonaire or Cozumel, including air fare and $1,200 of Nikonos equipment. The second and third place prizes (nine each) distribute an additional 27 free dive vacations on these same islands and thousands of dollars worth of Nikonos products. There are 30 prizes for fourth place winners and honorable mention. It's easy to see that winning is one fantasy you have a good chance of turning into reality.

In addition to fortune, fame is also a prize for Shootout winners. SKIN DIVER will publish the first place photos and all the winners' names. If slight considerations such as your career or family prevent you from becoming a professional underwater photographer, this is your shot at the title.

The last and best part is shoot 'em up. Once you've settled in on the island of your choice, just stop and register at the shootout headquarters on that island. Now you're eligible to participate in three different categories: wide angle, normal and close-up. Competition in these categories is held on different days and you get the entire day to shoot your film. It works like this: You stop by the photo center and pick up your free (courtesy of Kodak) registered roll of film. You get all day to expose the 36 frames of Ektachrome 100 and may dive from a boat, off the shore—anywhere you choose—as long as you don't leave the island. At the end of each of the competition days, you turn in your film for processing. (You must pay a modest charge for film developing, the only extra expense in your Shootout vacation.) The next day you return to view your film and pick the slide you'd like to enter. Hand the slide to one of the judges and you're ready to start winning those prizes!

Having judged last year's Shootout, I can attest to the fact that all underwater photographers are indeed created equal. Since professional underwater photographers, who are used to shooting on these types of deadlines, are barred from the contest, there were some surprising results. The judges (editors of SKIN DIVER Magazine and Nikonos Technique) only see the slides and don't know who actually took the photo until the Awards Night. And, what a surprise! The number of first year photographers and, in a couple of cases, first time underwater photographers winning prizes was pretty amazing.

1987 NIKONOS SHOOTOUT

To try for $60,000 in prizes, enter the 1987 Nikonos Shootout by calling the following toll free numbers:

Grand Cayman: Shootout will be held May 2-9. Call (800) 262-7686 or (800) 526-1394.

Bonaire: Shootout will be held May 30-June 6. Call (800) 345-0322.

Cozumel: Shootout will be held July 11-18. Call (800) 446-2166 or, in Texas, call collect to (713) 446-2166.

Notes:

1. You may enter one or all of the Shootouts.
2. You must use a Nikonos camera.
3. Only amateurs may enter.
4. You may win—good luck!

Of course, the free photo lectures and seminars by professional photographers Steve Frink (Cayman) and Rick Frehsee (Bonaire) didn't hurt—nor did the guest lectures by SKIN DIVER publishers Paul Tzimoulis and Bill Gleason and Nikon's photo professionals Frank Fennell, Bill Pekala and Scott Frier.

Each seminar is dedicated to one of the specific categories—wide angle, normal or close-up—and is held the day before the corresponding contest. Thus, new photographers and veterans can get expert advice before they shoot. The judges and staff are available to discuss technical and equipment problems as well as critique finished slides in an effort to improve your work. Most participants last year said the seminars and informal critique sessions were enough to make them return this year. Some admitted the $60,000 in prizes didn't hurt either.

This is a lot more than just the best photo contest ever held for divers. In addition to a great diving vacation, the seminars, lectures and help from the very professional Nikon staff make for a special event. At week's end, Awards Night brings the contest to a close, so everyone knows just what they've won before their vacation is over. There's no regimentation and it's up to you to decide whether to participate in any category or even if you want to submit a slide for judging after each competition.

The sponsors deserve tremendous credit. In addition to See and Sea and Qantas, each of the three islands fully supports the Nikonos Shootout. On Cayman, that includes the Department of Tourism, Cayman Airways and the host hotels, Royal Palms and Holiday Inn. On Bonaire, it's an island-wide project, with the Flamingo Beach Hotel, Bonaire Beach Hotel and Cap'n Don's Habitat all playing host. ALM is the host airline for this week. On Cozumel, La Ceiba Hotel and Casa del Mar are headquarters for the Shootout. Continental Airlines gives its support for this leg of the contest.

A word of advice: Staying at one of the host hotels, while not mandatory, is highly recommended. While you can dive anywhere, the lectures, seminars and most of the fun takes place at them. The hotels offer their standard dive package pricing for the week, so there's no extra charge for the diver to join the Shootout.

So, sign up, show up and shoot 'em up. Have a great vacation and, with a little luck, your next one will be free.



Nikonos-V automated sophistication. New accuracy and convenience shooting underwater or above.



Nikonos-V with TTL (Through The Lens) flash metering brings you a totally new level of accuracy assuring precise exposure control and the revolutionary convenience of not having to measure or calculate anything. That's because the camera itself controls the flash, reading the light that falls on the film plane and shutting off the flash at the moment of optimum exposure. You get great pictures every time. Just focus and shoot.





Manual Shutter Speed Control
With a full range of manual shutter speeds at your command, you have the ability to make the exposure *you* want. You can compensate for backlighting, overcome difficult conditions, take advantage of unusual situations.

Example: This shot made at 1/60 sec., f8 and top lighting with the SB102 at manual 1/4 power. Creative control is in your hands.



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Accuracy, convenience, control—all yours with the automated sophistication of the Nikonos-V. See the entire system at your Nikonos dealer, or contact Nikon Inc., 623 Stewart Avenue, Garden City, N.Y. 11530.

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DIVE TO ADVENTURE FILMS

This is the 10th year Jack McKenney will present his popular Dive to Adventure program. Three new films have been added—a total of 25 films from which to choose. They range in length from 15 to 30 minutes. Each festival usually consists of two hours of entertainment. The sponsors are able to put together the show that best fits their particular geographic needs or interests.

McKenney's latest film, *The Bay of Dolphins*, was produced as a conservation effort to set aside part of the remote Fernando de Noronha Archipelago, off the coast of Brazil, as a marine preserve. Schools of 500 spinner dolphins have resided here since the first recorded sightings in 1700. Some exquisite slow motion footage of the dolphins, bird life, a giant jewfish and octopus highlight this very beautiful film.



Scuba Diving America is a fascinating two part film featuring ordinary people from various walks of life. These interesting Americans take the audience diving on the oil rigs in the Gulf of Mexico, to Lake Geneva for some valuable bottles, wreck diving off New Jersey and diving into the world of blue sharks off Southern California. That's show one. Show two starts out with a dive on the German WW II submarine *U-352* off North Carolina, then to the Pacific Northwest waters for a look at some exquisite marine life. Bonne Terre Mine in Missouri is an interesting dive and the Florida Keys wraps up this segment. Both films run 26 minutes.

Dive stores, clubs, councils and colleges have produced Dive to Adventure shows to promote diving, raise money for charity or simply to make a profit. It's a social event designed to attract nondivers into the fold and to stimulate divers seeking to expand their horizons.

To inquire about producing a Dive to Adventure show, costs and the mechanics of production, contact Jack McKenney at 1842 Micheltorena St., Los Angeles, CA 90026 or call (213) 663-3486.



Nikonos-V. Buy now. The extras are free.

Now's the best time ever to buy the world's best underwater camera system—Nikonos-V—the only one to bring you the advanced features of Through-The-Lens flash metering for optimum exposures every time, a large, easy-to-use viewfinder, the option of complete manual control and the most accurate built-in light meter ever designed for underwater use.

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An absolute must for clear, sharp underwater macro photographs. Set allows reproduction ratios of 1:2, 1:1, 2:1. $144 value.

Buy an SB-102 or SB-103 Speedlight and get a Super QXL3 dive light free. The powerful SB-102 and compact SB-103 offers optimum exposure accuracy plus convenience.

Super QXL3 Dive Light with Holder.

Powerful, yet small enough to go on every dive. Universal holder attaches light to strobe. For searching ledges, revealing hidden colors, aiming strobe. $42 value.

The camera system that brought advanced automation to underwater photography now brings you its biggest bonus deals ever. Offer expires March 31, 1987. See your Nikonos dealer for details now.

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For further information write: Nikon Consumer Relations, Dept. N58, Nikon Inc., 19601 Hamilton Ave., Torrance, CA 90502-1309. © 1987 Nikon Inc.

Tabata BC Jacket

A Masterpiece Of Color And Design



TEXT AND PHOTOGRAPHY BY BONNIE J. CARDONE

Masterpiece: The Tabata Liberator BC jackets shown on this page define the word, which is, according to *The Random House Dictionary of the English Language*: 1. one's most excellent production, as in art; one's best work. 2. any production of masterly skill. These BCs are really "lovely to look at." Shades of lavender, pink and blue, they are accented with orange, yellow, navy, black and gray. Color coordinate a Liberator with the rest of your gear to be picture pretty underwater.

Fortunately, Tabata engineers didn't settle just for good looks. These BCs are also state of the art in function and comfort. Among their new features is the one that has given them their name, Liberator: Quick release buckles on chest straps that allow you to doff and don the BC in seconds. As the Tabata ads say: "Click. It's on. Click. It's off." The straps replaced bulky chest panels, streamlining the jacket and reducing drag. They also eliminated unnecessary buoyancy so you won't need as much weight with this jacket as you might with others. The chest straps can be shortened or lengthened to fit you.

The shoulders above the straps are padded to distribute the weight of the tank and make wearing it above water more comfortable. Also new on these BCs is a padded backpack cover. This will be especially appreciated by warm water divers who do not wear a layer of neoprene between back and pack that acts as a cushion.

The Liberator comes with a low pressure inflator. At the top of the the corrugated hose to which it is attached is an overpressure relief/dump valve. To vent air from the BC, simply pull down on the hose. The valve can be unscrewed and its orifice used to rinse the BC with fresh water when your dive day is over. The Liberator has a CO_2 detonator, but this can be easily unscrewed and replaced with a cap that comes with the BC.

In addition to the adjustments that can be made with the chest straps, there are three other ways to ensure the BC fits you; a Velcro® closing cummerbund and two quick release buckles on the front.

The Tabata BC has five accessory D-rings, so there is no lack of places to attach things. If you like pockets, these BCs will make you deliriously happy—there are four. You can store your octopus in one and still have three others to stuff things in. All of them close with Velcro flaps and have mesh panels that allow water to drain. There is a whistle attached to the corrugated hose with a removable, Velcro closing band.

A soft tank band is found on almost all jacket BCs today and the Liberator is no exception. Tabata adds a rubber sleeve to prevent slippage. The part of the backpack that goes against the tank has two rubber inserts, also to help prevent slippage.

SKIN DIVER tested the Liberator on two separate dive trips. It lived up to all our expectations, performing the functions it was supposed to flawlessly. It was comfortable both underwater and topside and, made us photogenic!

The Liberator BC comes in four sizes: XS, S, M and L. The cost of this masterpiece? It's just $350. See one at your nearest Tabata dealer. For more information you can write the company at: 2380 Mira Mar Avenue, Long Beach, CA 90815.



The Great Nikonos Shootout 1987

It's the world's most prestigious underwater photography contest held at Grand Cayman May 2–9, 1987, Bonaire May 30–June 6, 1987 and Cozumel July 11–18, 1987.

Sign up

To register and make your reservation to whichever destination you choose, you must call one of these **"Shootout" Hotlines: Grand Cayman: 800-526-1394 or 800-262-7686, Bonaire: 800-345-0322, Cozumel: 800-446-2166.**

Enter all three shootouts and triple your chances.

Shoot 'em up

Take your best shots. Kodak supplies the film. All you pay for is the processing. Judging will be done by the photo editors of Nikonos Technique Magazine and Skin Diver Magazine. **Winning pictures will be published in Skin Diver and Nikonos Technique.**

You Could Become a World Famous Photographer Overnight!

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on underwater photography. Learn how the pros do it. Their seminars alone are worth the trip and can help you win.

$60,000 in prizes for the best underwater shots.

Grand Prize

A week for two at the world's greatest dive location—**the Coral Sea!** Air transportation from California courtesy of Qantas Airlines. Plus, accommodations on board See & Sea's luxury, live-aboard dive boat complete with captain and crew. Plus more—$3,000 worth of Nikonos photo equipment.

8 - 1ST prizes

One week dive vacation for two awarded to Bonaire, Grand Cayman, or Cozumel, including airfare, plus $1,200 worth of Nikonos equipment.

9 - 2ND prizes

One week dive vacation for two awarded to Bonaire, Grand Cayman, or Cozumel, including airfare, plus $800 in Nikonos equipment.

9 - 3RD prizes

One week dive vacation for one awarded to Bonaire, Grand Cayman, or Cozumel, plus $400 in Nikonos equipment.

30 - 4TH prizes

Other photo and diving prizes.

57 Prizes in 3 different categories.

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Contest open to amateurs only; you must use a Nikonos camera. The great Nikonos Shootout will take place only on the dates and at the locations specified. All travel and diving arrangements must be coordinated through the listed "Shootout" Hotline numbers. Good luck and good shooting.

Complete "Shootout" details are on the entry form available at your Nikon dealer or by calling the "Shootout" hotline.

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SUBSTROBE MS

Ikelite's Mini Strobe With Slave Capability

TEXT AND PHOTOGRAPHY BY GERI MURPHY

You would think America's largest manufacturer of underwater strobes would produce a model for just about every occasion. Well, it does. Ikelite currently builds eight different strobes that cover the entire field of U/W lighting.

One of the company's most versatile models is the little Substrobe MS. It is the perfect answer for anyone considering multi-flash lighting for macro, close-up or fish photography. Here is a mini strobe that is so inexpensive you can actually afford to purchase two. The unit is compact, very easy to operate and can be mounted on practically any camera rig you may have—bolt it to your housing, set up dual flashes on your Nikonos or stick one into your BC pocket.

But, most important, the Substrobe MS will serve double duty: Operating as either a simple manual flash or as an independent, remote slave unit, it is a marvelous little workhorse that can greatly improve your photographic style.

BASIC DESIGN

The Substrobe MS is a second generation descendant of the original Substrobe M, introduced in 1981. Six years of experience and steady performance have proven the M series to be one of the most reliable mini strobes on the market today.

The MS is ultra-compact, measuring only four and one-half inches in length and slightly more than three inches in diameter. It is a little bit taller than a standard coffee mug. It weighs 1.3 pounds out of the water and is only a couple of ounces positive underwater.

This little mini strobe is powered by four AA cells that are easily changed by opening a door on the back. A fresh set of alkalines will produce 250 flashes. Recycle time is a moderate five seconds. The MS will also operate on rechargeable AA nickel cadmium cells. These reduce recycle time to three seconds and the number of flashes to 150.

The angle of coverage is 65 degrees—enough to fully cover the field of either a Nikonos 28 or 35mm lens. The energy rating for this little strobe is a surprising 33 watt-seconds. It produces sufficient power for an exposure of f/22 at one foot using ASA/ISO 100 film. It will give you an f/8 exposure at a distance of three feet using the same film.

SUBSTROBE MS

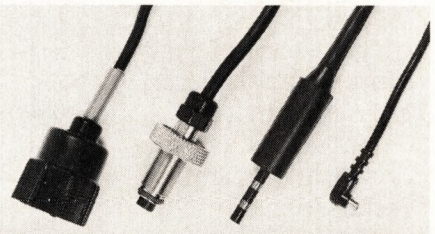
Power output	33 watt/seconds
Power source	4 AA alkaline cells or rechargeables
Power modes	Full only
Number of flashes	250/alkalines 150/rechargeables 180/Ikelite rechargeables
Recycle time	5 seconds/alkalines 3 seconds/rechargeables
Ready light	Orange/magnifier port
Charging time	Non-applicable
Angle of coverage	65 degrees
Flash tube	Straight
Color temperature	5,800° Kelvin
Flash modes (2)	Manual and slave
Focus light	None
Sync cord	Detachable/coil design
Sync cord types (5)	1) Ikelite 2) Nikonos III, IV, V 3) Nelson 4) EO 5) Above water PC
Slave mode	Yes
Depth rating	300 feet
Weight	1.3 pounds/air 2 ounces positive/U/W
Flash Arm	5 different systems

SPECIAL FEATURES

What distinguishes the Substrobe MS from the standard Substrobe M is its slave mode capability. The MS has a built-in slave sensor directly above the flash tube reflector. This sensor is very responsive and will allow you to operate slave mode in shallow water under brightly lit conditions. The Substrobe MS can be fired by either the standard sync cord (connected to the camera) or remotely by another flash.

The MS also features a detachable sync cord. This means the strobe can operate as a compact, cordless slave unit. The sync cord is replaced by a special metal cap fitted with an O-ring seal.

The detachable sync cord of the Substrobe MS allows tremendous versatility. Ikelite manufactures five different types of cords for this unit: Ikelite, Nikonos, Nelson, EO and above water PC connector.



Top: The Substrobe MS can be operated with a sync cord (left) or as a remote slave. Above: Five sync cords are offered. The four shown are Ikelite, Nikonos, EO and above water PC.

The Substrobe MS can be connected to just about any make or model of camera housing and at least three different Nikonos models (III, IV, V).

This mini strobe can be mounted on any of Ikelite's five flash arm systems. I found the most versatile to be the Ikelite Substrobe Handle—a pistol grip that doubles as a short flash arm. In addition, Ikelite produces a matching mount that allows an Ikelite Mini C-Lite to be attached to the strobe for aiming and focusing.

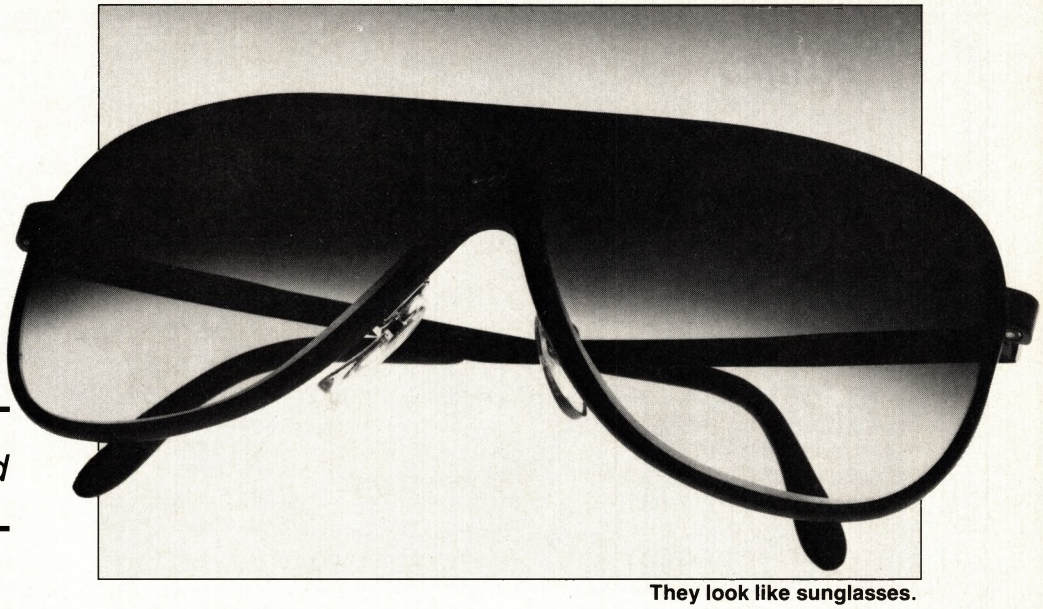
CONCLUSION

After a year of open water testing, I am happy to report the Substrobe MS is just as reliable as its predecessor. The flash output is consistent for every shot. Possibly the only limitation of the MS is that it is non-TTL. However, I did not find this to be a problem since TTL mode is not especially desirable for multiple flash macro photography anyway. TTL tends to produce a flat lighting effect instead of the

(Continued on Page 34)

Vision Breakthrough

When I put on the pair of glasses what I saw I could not believe. Nor will you.



They look like sunglasses.

By Joseph Sugarman

I am about to tell you a true story. If you believe me, you will be well rewarded. If you don't believe me, I will make it worth your while to change your mind. Let me explain.

Len is a friend of mine who has an eye for good products. One day he called excited about a pair of sunglasses he owned. "It's so incredible," he said, "when you first look through a pair, you won't believe it."

"What will I see?" I asked. "What could be so incredible?"

Len continued, "When you put on these glasses, your vision improves. Objects appear sharper, more defined. Everything takes on an enhanced 3-D effect. And it's not my imagination. I just want you to see for yourself."

When I received the sunglasses and put them on I couldn't believe my eyes. I kept taking them off and putting them on to see if indeed what I was seeing through the glasses was indeed actually sharper or if my imagination was playing tricks on me. But my vision improved. It was obvious. I kept putting on my cherished $100 pair of high-tech sunglasses and comparing them. They didn't compare. I was very impressed. Everything appeared sharper, more defined and indeed had a greater three dimensional look to it. But what did this product do that made my vision so much better? I found out.

DEPRESSING COLOR

The Perception sunglasses (called BluBlockers) filter out the ultraviolet and blue spectrum light waves from the sun. You've often heard the color blue used for expressions of bad moods such as "blue Monday" or "I have the blues." Apparently, the color blue, for centuries, has been considered a rather depressing color.

For eyesight, blue is not a good color too. There are several reasons. First, the blue rays have one of the shortest wavelength in the visible spectrum (red is the longest). As a result, the color blue will focus slightly in front of the retina which is the "focussing screen" onto which light waves fall in your eye. By eliminating the blue from the sunglasses through a special filtration process, and only letting those rays through that indeed focus clearly on the retina, objects appear to be sharper and clearer.

The second reason is even more impressive. It is not good to have ultraviolet rays fall on our eyes. Recognized as bad for skin, uv light is worse for eyes and is believed to play a role in many of today's eye diseases. In addition, people with contact lenses are at greater risk because contacts tend to magnify the light at their edges thus increasing the sun's harmful effects.

Finally, by eliminating the blue and uv light during the day, your night vision improves. The purple pigment in your eye called Rhodopsin is affected by blue light and the eyes take hours to recover from the effects.

SUNGLASS DANGER

But what really surprised me was the danger in conventional sunglasses. Our pupils close in bright light to limit the light entering the eye and open wider at night—just like the aperture in an automatic camera. So when we put on sunglasses, although we reduce the amount of light that enters our eyes, our pupils open wider and we are actually allowing more of the blue and ultraviolet portions of the light spectrum into our eyes.

BluBlockers sunglasses are darker at the top to shield out overhead light. The lens used is the CR-39 which most eye doctors will tell you is one of the finest materials you can use for glasses and is manufactured under license.

The frames are some of the most comfortable I have ever worn. The moulded nose rest will fit any nose. The hinge causes the frames to rest comfortably on your face and can be adjusted for almost any size face.

We also have a clip-on pair that weighs less than one ounce. Both come with a padded carrying case and an anti-scratch coating.

I urge you to order a pair and experience the improved vision. Then take your old sunglasses and compare them to the BluBlockers. See how much clearer and sharper objects appear with BluBlockers. And see if your night vision doesn't improve as a direct result. If you don't see a dramatic difference in your vision—one so noticeable that you can tell immediately, then send them back anytime within 30 days and I will send you a prompt and courteous refund.

DRAMATIC DIFFERENCE

But from what I've personally witnessed, once you use a pair, there will be no way you'll want to return it.

Astronomers from many famous universities wear BluBlockers to improve their night vision. Pilots, golfers, skiers, athletes—anyone who spends a great deal of time in the sun have found the BluBlockers indispensable.

Our eyes are very important to us. Protect them and at the same time improve your vision with the most incredible breakthrough in sun glasses since they were first introduced. Order a pair or two at no obligation, today.

To order, credit card holders call toll free and ask for product by number shown below or send a check plus $4 for delivery.

BluBlockers (0020SDV) **$59.95**
Clip-On Model (0022SDV) **34.95**

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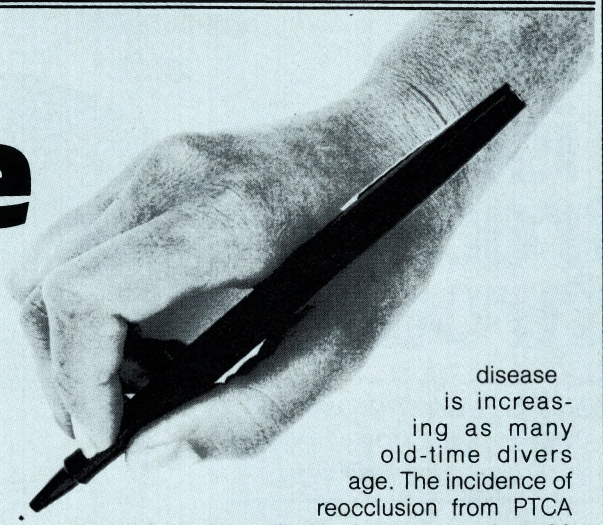
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Diving Medicine

BY ALFRED A. BOVE, M.D., PH.D.



This month's column is a collection of responses to reader's letters. They represent answers to often-asked questions that should be helpful to those with similar problems.

STOMACH SURGERY

Generally, after a suitable recovery period, one can return to diving after gastric surgery. There is a need to regain strength and fitness and to allow adequate time, about six months, for the tissues to heal completely. Exercise is needed to get back in shape. This can be walking or swimming.

HYSTERECTOMY

It usually takes four to six months for all of the tissues to fully heal and regain strength after a gynecological operation. Diving should be avoided until the patient is back in good physical condition and has strengthened the abdominal muscles with some mild exercises.

Note the type of surgery in the abdomen is less important than the fact muscles must be strengthened and general physical condition restored before returning to diving.

KIDNEY TRANSPLANT

There is not much information on diving with a transplanted kidney. The medications needed cause no specific problems with diving, although such patients are more prone to aseptic bone necrosis from the prednisone that is used to prevent a rejection reaction. To avoid any chance of decompression sickness, dive conservatively. Otherwise, the risk is in trauma to the kidney area from diving and the possibility of getting bends in the surgical area where the new kidney was implanted. None of these considerations can be made firmly, however, because there are no studies, only theories. I think diving will be safe if done conservatively. Avoid difficult, deep or prolonged dives that could produce decompression sickness.

WOMEN AND DIVING

There are really no unique problems for women who dive except for extremely heavy lifting. The incidence of decompression sickness is not increased in women divers as far as we know.

Women who take birth control pills are slightly more prone to blood clotting than those who do not. However, we have no data on an increase in decompression sickness for pill use, so dive carefully and avoid the risk of bends.

The Undersea Medical Society recently held a workshop on Women in Diving and the proceedings will soon be available. Inquiries should be directed to the UMS at 9650 Rockville Pike, Bethesda, MD 20814.

ADVICE TO A PHYSICIAN

It is not necessary to exclude all heart bypass patients from returning to diving or from taking up the sport. There appears to be no difficulty with the surgery per se, including the altered chest mechanics that occur after a thoracotomy. The most important issue in determining whether a patient can dive is whether he/she can tolerate the exercise needed to dive safely. In general, I recommend that all individuals who take up diving be in good enough physical condition to withstand 13 mets of exercise on an exercise test. This would be 12 minutes or stage IV of the Bruce protocol. If the patient can exercise to 13 mets with no angina, no ischemic changes on his ECG and a normal blood pressure response, then he/she can sport dive safely in comfortable water. I would not recommend diving in cold, deep (below 100 feet) water or in conditions that might require an extreme energy output, such as in currents, under ice, in caves, in rough seas, etc.

If there is still an ischemic response at 13 mets, I would not allow this individual to dive. In addition, if a patient does qualify at present, I would strongly suggest he/she maintain a continuing conditioning program and be tested yearly to be sure tolerance to exercise is retained.

BALLOON DILATION

The number of divers with coronary disease is increasing as many old-time divers age. The incidence of reocclusion from PTCA (balloon dilation) is presently about 30 percent. If there is a second one, and the likelihood of success is 70 percent, the diver should be able to remain free of chest pain. In any type of coronary disease problem, the major issue is exercise tolerance. There is no specific interaction between the diving environment and coronary disease, except that diving is a sport that requires physical exercise. Those who develop ischemia during mild exercise are at risk for myocardial infarction or sudden death while exercising, including diving.

To determine exercise tolerance there must be a treadmill test that can demonstrate no ischemia to at least 13 mets (12 minutes, Bruce protocol) before the patient can expect to dive safely. If ischemia is developed at a lower level of exercise, I would not advise diving.

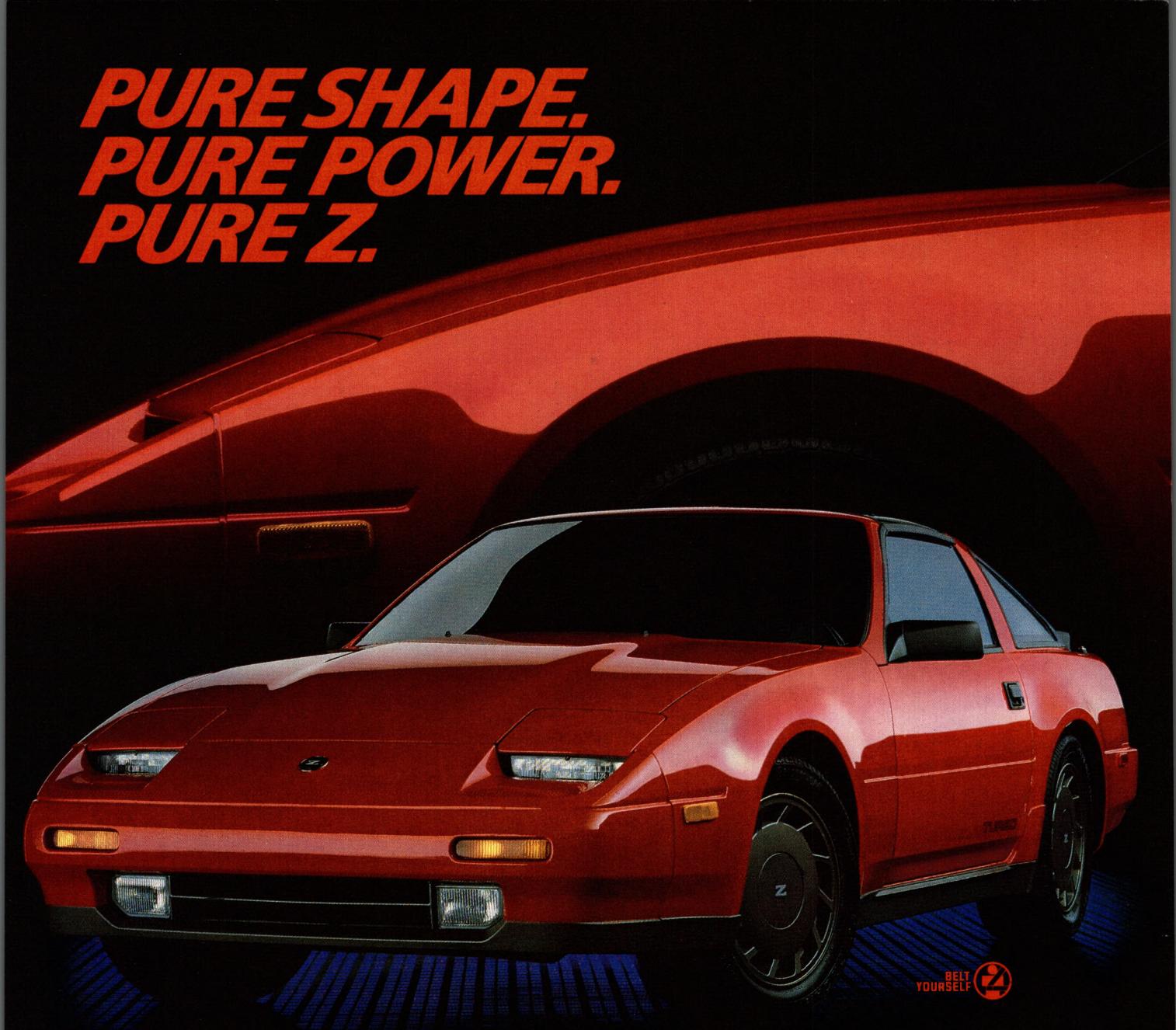
Incidentally, an exercise program goes a long way in preparing anyone for the physical exercise associated with any sport. A cardiologist can prescribe exercise that will improve a patient's condition. Smokers should stop. This habit alone produces continuing damage to coronary arteries.

HISTOPLASMOSIS

Histoplasmosis affects the lungs and is a subacute illness that may take six or more months to resolve. There are sputum and blood tests that can be done to be sure the patient is not contagious. Patients should not dive while the disease is active. After the disease is arrested, there should be pulmonary function testing before diving to be sure there are no areas of air trapping that would increase the risk of air embolism.

A physician can determine the status of the illness and the ability of the lungs to empty all segments normally. These criteria must be met before anyone with histoplasmosis can safely return to diving.

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SUBSTROBE MS

(Continued from Page 30)

creativity that multiple flash offers. If you have your heart set on TTL, buy the Substrobe MV instead.

Price is a compelling attraction of the MS. The flash retails for $149.95. The sync cord is extra, and ranges in price from $29.94 to $119.95, depending on the one you select. The Nikonos sync cord is $49.95. Flash arm systems for the Substrobe MS range in price from $29.95 to $59.95, depending on the features desired. A simple pistol grip strobe handle sells for as little as $16.95.

For more information, see your local Ikelite dealer or contact: Ikelite Underwater Systems, 50 West 33rd Street, Indianapolis, Indiana 46208 or telephone (317) 923-4523.

SEA FANS VIDEO MAGAZINE

A team of Denver-based dive and video professionals has introduced Sea Fans—a magazine on videotape. The premiere issue of this quarterly magazine is now available through dive stores everywhere or directly from Sea Fans. Every issue is filled with 90 minutes of broadcast quality coverage of diving topics.

The premiere issue of Sea Fans features tours of Kauai, Bonaire and the Sea of Cortez; a photo clinic and interview with the award-winning author and photographer of *Within a Rainbowed Sea*, Chris Newbert; aquanaut certification—24 hours in an Underwater Habitat; equipment reviews; and much more.

Each issue will feature three to four dive destinations, an underwater photo clinic with renowned underwater photographers, exciting footage of unique underwater phenomena from notable cinematographers, studies of marine life, reviews of the newest dive products, interviews with diving personalities and updates on dive and safety techniques.

Sea Fans Video Magazine is produced and distributed quarterly and available for subscription (four issues per year) or by single issue. An annual subscription is $119.95—$39.95 for single issues. Sea Fans provides a money-back guarantee if not completely satisfied. Twenty-five percent of the net profits from sales of Sea Fans will be contributed to one or more non-profit foundations.

Further information about subscriptions or single issue orders, feature stories, the dealer distribution program or advertising can be obtained from Sea Fans Video Magazine, Suite 1000, One Denver Place, 999 18th Street, Denver, CO 80202; (303) 393-8541. Credit card subscriptions or single issue orders can be placed by calling (800) 628-2828, ext. 908.

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COUSTEAU VIDEOS

Pacific Arts Video has released the six remaining segments of the ten-episode, award-winning series *The Undersea World of Jacques Cousteau*.

Narrated by Rod Serling, *The Undersea World of Jacques Cousteau* includes adventures to exotic lands. Pacific Arts Video has made these journeys available for home viewing.

With two Emmy Award nominations, *Octopus-Octopus* (PAV-637) is one of the most engrossing studies of this legendary eight armed creature. In *Octopus-Octopus* Cousteau introduces the viewer to the more than 150 species and demonstrates the intelligence and learning ability of this unique animal.

The marine iguana, an intriguing reptile that has reversed the course of evolution and returned to the sea for food and survival, is the subject of *The Dragons of Galapagos* (PAV-638). We travel with Cousteau and his team 600 miles off the coast of Ecuador to the Galapagos Islands, where they conduct experiments to test the iguana's regulation of body temperature, nesting and mating habits, territoriality and other behavior patterns. And, as an unexpected delight, the *Calypso* encounters a herd of sea lions.

Most everyone wishes they could see the California gray whales in their breeding ground in Baja, California. In *The Desert Whales* (PAV-639) Cousteau takes us on an adventure to the once-secret retreat of these 35 ton leviathans, discovered by chance in the warm Baja waters by a 19th century whaling captain.

Cousteau treats us to an intimate look at the penguin in the last of the six programs, *Cousteau in the Antarctic* (Part II): *The Flight of Penguins* (PAV-640). On a space-age Antarctic expedition in cooperation with NASA, Cousteau and his team study this ancient and funny bird while documenting primary Antarctic food resources and their use by creatures like the penguin.

In *The Forgotten Mermaids* (PAV-641), Cousteau and his divers take us to the cypress glades of East Florida to film the manatee, a gentle vegetarian whose closest relative is the elephant.

The Indian Ocean, the coast of Baja and California's Marine World are the locations for the filming of *Whales* (PAV-642). This documentary of Cousteau's expedition in search of the finback, sperm and killer whales is as exciting as the archival footage of the famed whaling ship, *Charles W. Morgan*, during its last voyage in 1921 that Cousteau intercuts into the show.

Pacific Arts Video is offering these 60 minute color programs in Beta and VHS for $24.95 each.

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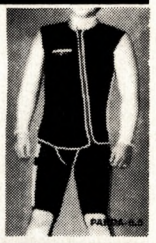
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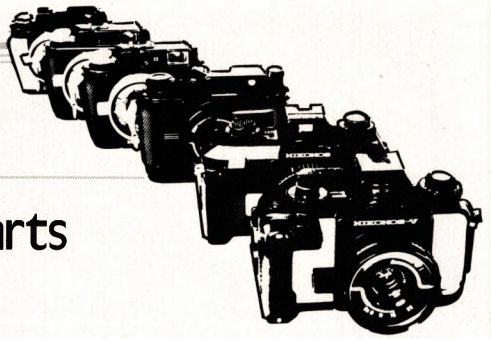
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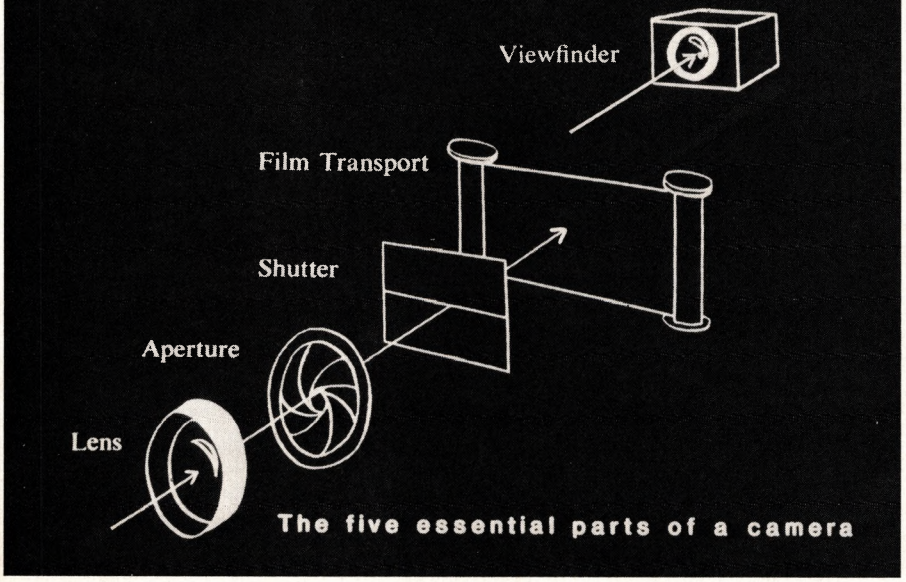
LESSON II: Basic Camera Parts

TEXT AND PHOTOGRAPHY BY GERI MURPHY



NIKONOS V

Above: The five basic parts of the Nikonos V camera. The lens and aperture are combined into one module. Below: Light passing through the lens is focused. The aperture limits the amount of light reaching the shutter and the shutter controls the length of time the light strikes the film. The film transport mechanism evenly spaces each frame. The viewfinder allows the photographer to compose the picture.



The five essential parts of a camera

Understanding the essential parts of a camera will help you to operate the Nikonos V. These basic building blocks of knowledge form the foundation of the camera's sophisticated design.

THE BLACK ROOM

Think of a Nikonos V as a miniature room that is completely black inside. On the front wall there is a doorway through which light can shine. On the back wall, a large strip of photographic film has been hung. In addition, a large glass window (lens) just outside the door helps to sharpen the light rays streaming through the doorway.

When the door is opened momentarily, light streams into the room, strikes the film and creates an image. The film is coated with light sensitive chemicals that capture the image for later development.

This is a basic description of what goes on inside every camera. There may be many additional features, but the basic camera function is the same.

FIVE ESSENTIAL PARTS

Every camera, whether large or small, has five essential parts. Without these the camera could not function as a photographic tool. These parts are: the lens, aperture, shutter, film transport and viewfinder. Let's see how each of them works.

THE LENS

The lens is made of a series of precisely ground and polished glass elements. By turning the focusing knob, these glass elements are moved back and forth inside the barrel of the lens and thus sharply focus the image at various distances from the camera.

The Nikonos 35mm lens, which comes standard with the camera, is amphibious. It will sharply focus on land as well as underwater. Its minimum focus distance is 2.75 feet. To focus any closer would require special close-up attachments.

THE APERTURE

The aperture is an adjustable size opening or hole positioned inside the camera lens. Its diameter can be increased or decreased by simply turning the aperture control knob. This knob has noticeable click stops at certain specified

positions known as f/stops. These units of measure are based on a relationship between the diameter of the hole and the focal distance of the lens involved. For example, an f/stop setting of f/8 would mean the diameter of the aperture would fit into the focal length of the lens 8 times (see diagram).

Each f/stop setting is twice the area (not diameter) of the next, larger number. For example, a setting of f/16 will allow twice as much light through the lens as a setting of f/22.

The Nikonos 35mm lens has a total of seven separate f/stops marked on its aperture scale: f/22, f/16, f/11, f/8, f/5.6, f/4 and f/2.5. This offers a wide range of control for the amount of light passing through the lens.

THE SHUTTER

The shutter is a mechanical device that permits the momentary passage of light from the lens to the film. It can be compared to a rapidly moving door. The type of shutter utilized in the Nikonos V is known as a focal plane shutter. It has two doors that rapidly move across the opening in approximately 1/90th of a second. By adjusting the width of the two doors, you achieve the shutter speed.

The Nikonos V offers a wide selection of speeds marked on the shutter speed selection knob. There are basically six, ranging from the slowest of 1/30th second to the fastest of 1/1000th second.

Each shutter speed is twice as fast as the one before. The exposure difference between each shutter speed is the equivalent of one f/stop. This way, the shutter and aperture can work in harmony, balancing the amount of light versus the duration of light that strikes the film (more about this later on).

In addition to the six basic shutter speeds, the Nikonos V has an automatic exposure setting (A) for electronic operation. There is also a mechanical setting (M90) that can be used in emergencies such as a dead battery.

THE FILM TRANSPORT

The film transport is an important device with many functions. It keeps the film flat, unwrinkled and precisely the correct distance from the lens to assure the sharpest possible image.

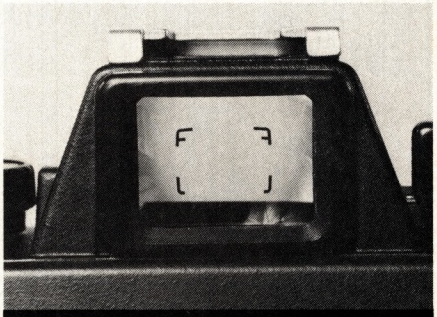
It also allows the film to slide smoothly across the back of the camera without sticking or scratching. The film take-up spool precisely measures the amount of film pulled across the back of the camera that will achieve even spacing of all 36 frames. In addition, the film take-up spool turns a series of gears that count the number of frames (1 to 36) that have been exposed.

VIEWFINDER

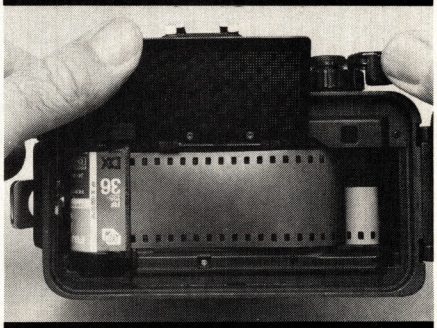
The viewfinder on the Nikonos V permits you to see the scene that is about to be photographed. It helps you to do two things: 1) aim the camera; 2) compose the picture within the limits of the viewfinder frame. This frame is etched onto the glass of the viewfinder.

In addition, the Nikonos V viewfinder allows you to view information about the electronic operation of the camera, including shutter speed, auto exposure and flash indicator.

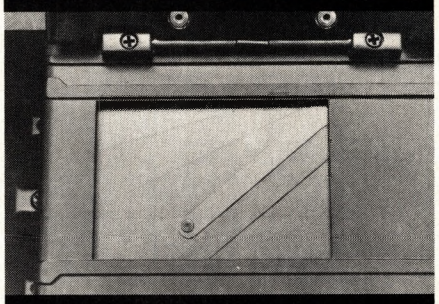
In the next lesson we will discuss the electronic functions of the Nikonos V and its automatic exposure features.



The viewfinder has the picture frame and parallax correction marks etched onto it.

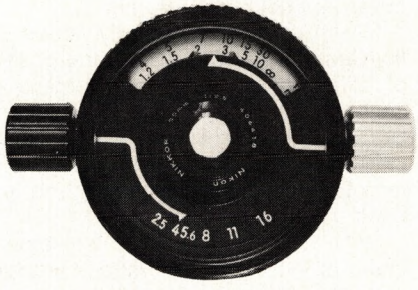


As well as moving the film, the transport holds it flat against the shutter opening.

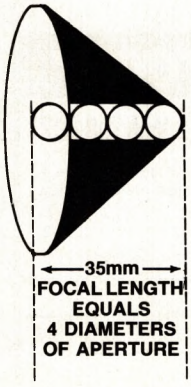


The Nikonos V shutter is a focal plane type and has corrosion resistant blades.

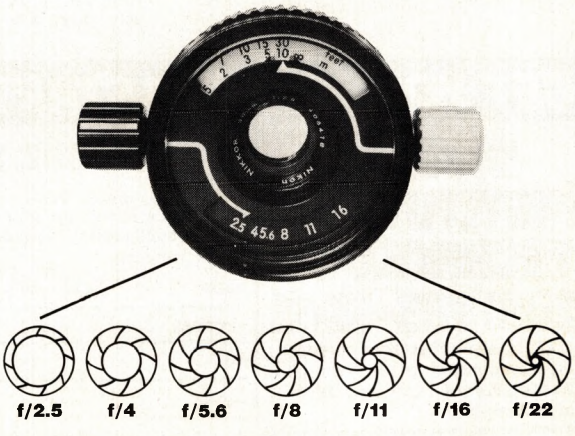
This diagram illustrates the formula for calculating aperture (in this case f/4): f/stop=focal length of lens÷aperture diameter. Note: larger aperture means smaller f/number.



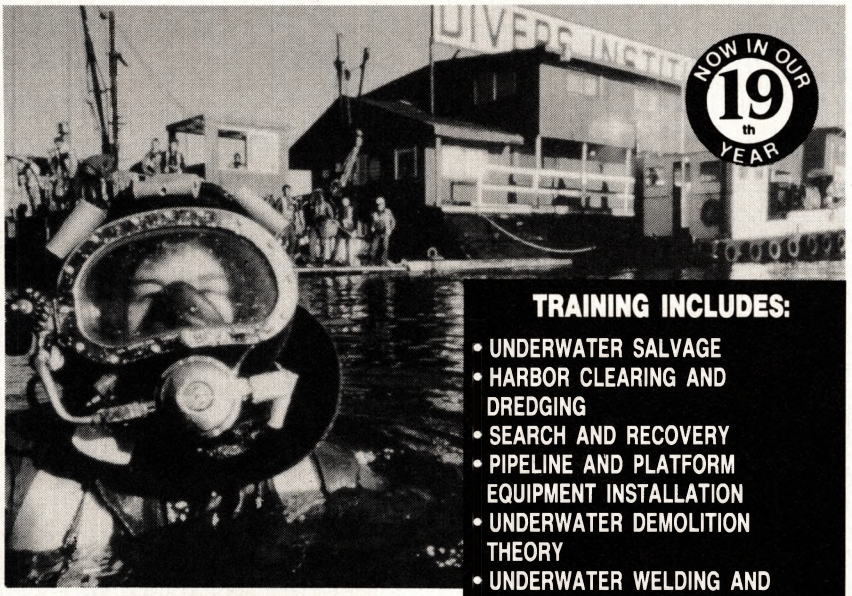
F/STOP = FOCAL LENGTH ÷ APERTURE DIAMETER



The Nikonos V 35mm lens has an aperture scale with seven f/stop settings. Moving right to left through the illustrations, each aperture is twice the area of the the previous one.



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DACOR PEOPLE

Clyde Noel, Dacor's representative for the West Coast for the past 18 years, recently retired. He began his association with Dacor in 1968 and became not only a Dacor representative, but also a friend and advisor to his accounts.

Because Noel has built up and increased the size of his sales territory, Dacor is splitting it in half and has retained husband and wife teams to handle each area. Michael and Jacqueline Thornhill are now covering Southern California, Nevada (Las Vegas area), Utah and Arizona. Mike was a scuba instructor and staff member at a San Diego dive store while Jackie was involved in law enforcement in Reno, Nevada. Both were associated with several companies offering a full line of scuba equipment. They may be contacted through Dacor or at their office: 27 Clover Hill Lane, Laguna Hills, California 92653.

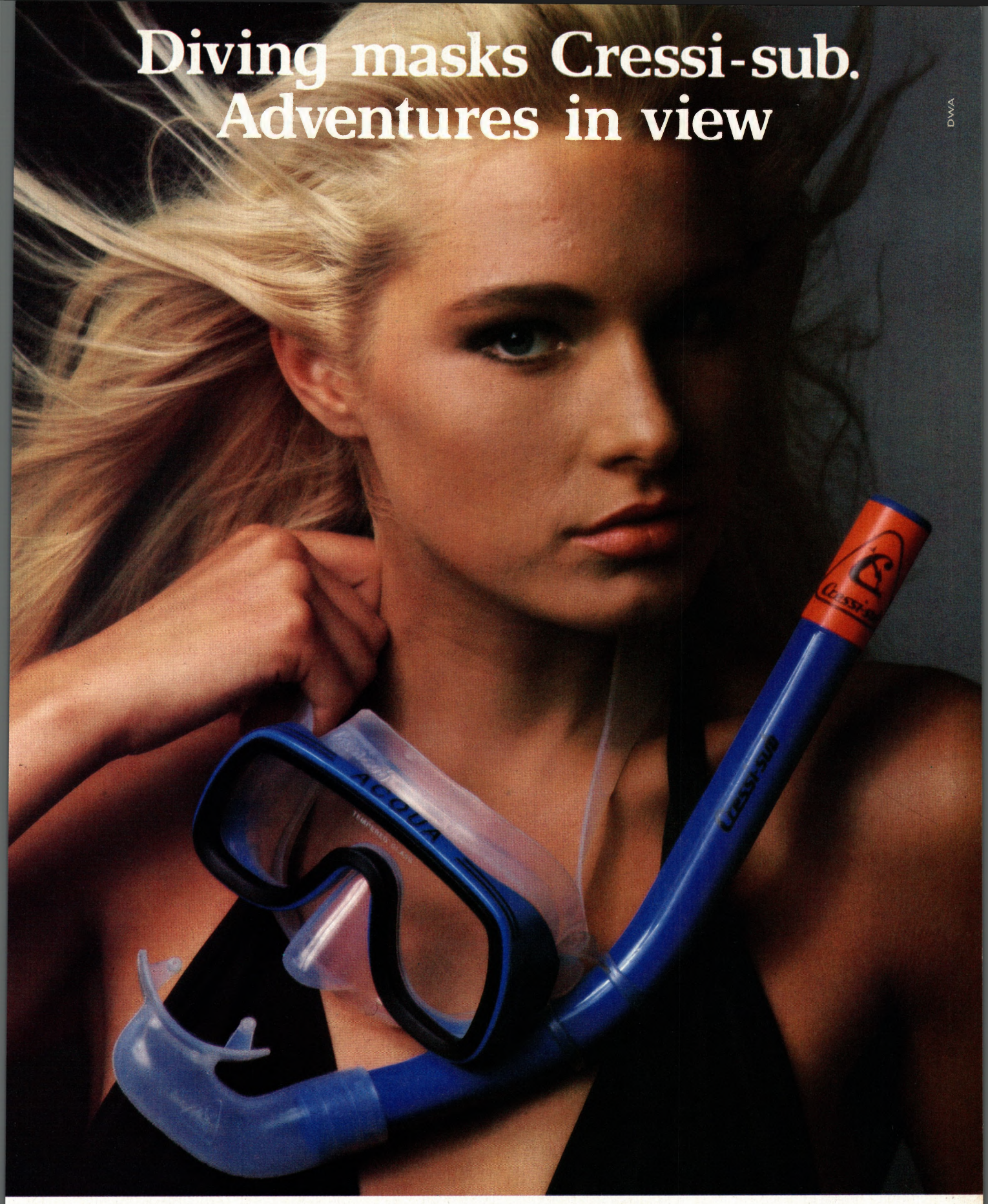
Ron and Jane Pavelka are covering Northern California, Idaho, Montana, Nevada (Reno area), Oregon, Washington and Alaska. Ron and Jane bring many years of experience at both the manufacturing level as well as being manufacturer's representatives. They may be contacted through Dacor or at their office: 2061 Woodside Drive, Santa Rosa, CA 95404.

NAUI COLLEGE

Recently released statistics reflected another healthy increase in student registrations and inquiries at NAUI College, a nine year old institution for training and career development of professional sport divers and diving instructors. Prospective student inquiries were up 95 percent over the second quarter of 1985 and student registrations for upcoming classes were up 110 percent. This makes the 14th consecutive quarter of growth for the Southern California based school. Interested parties are encouraged to contact the school offices at 27402 Camino Capistrano, Suite 103, Laguna Niguel, CA 92677; call toll free (800) 423-7095 or (800) 227-6663 in California.

NAUI College has recently added Cathy Dean to its office staff in the position of administrative assistant. Dean, a recent resident of Texas and a Chicago native, will handle the school's increasing telephone inquiries as well as organizing long term housing for students and textbook shipping.

NAUI College alumni are welcome to intern at the college in various teaching capacities at no cost for tuition in order to enhance their professional skills with leadership level course teaching experience. There are numerous intern spots available.



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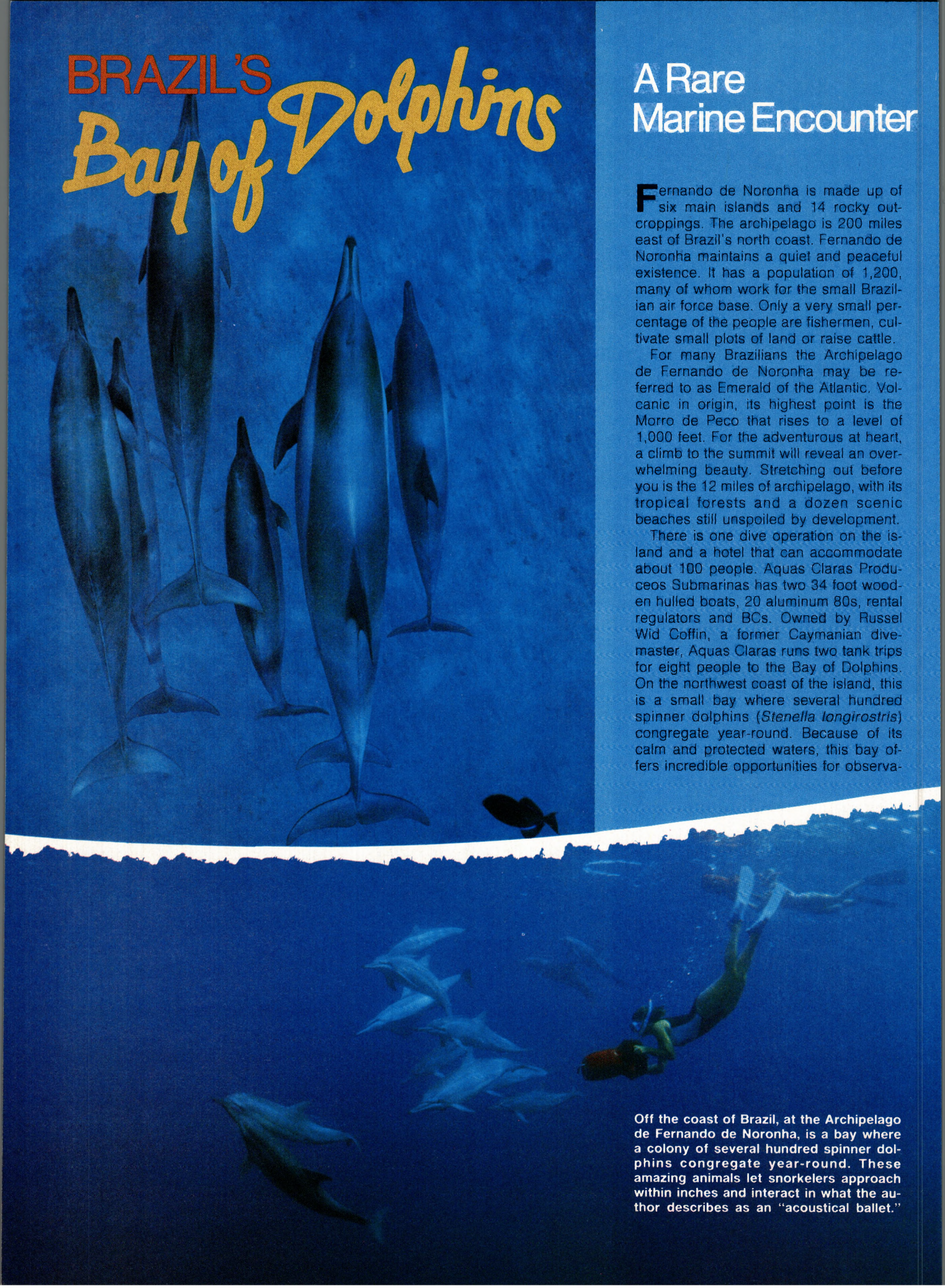
BRAZIL'S Bay of Dolphins

A Rare Marine Encounter

Fernando de Noronha is made up of six main islands and 14 rocky outcroppings. The archipelago is 200 miles east of Brazil's north coast. Fernando de Noronha maintains a quiet and peaceful existence. It has a population of 1,200, many of whom work for the small Brazilian air force base. Only a very small percentage of the people are fishermen, cultivate small plots of land or raise cattle.

For many Brazilians the Archipelago de Fernando de Noronha may be referred to as Emerald of the Atlantic. Volcanic in origin, its highest point is the Morro de Peco that rises to a level of 1,000 feet. For the adventurous at heart, a climb to the summit will reveal an overwhelming beauty. Stretching out before you is the 12 miles of archipelago, with its tropical forests and a dozen scenic beaches still unspoiled by development.

There is one dive operation on the island and a hotel that can accommodate about 100 people. Aquas Claras Produceos Submarinas has two 34 foot wooden hulled boats, 20 aluminum 80s, rental regulators and BCs. Owned by Russel Wid Coffin, a former Caymanian divemaster, Aquas Claras runs two tank trips for eight people to the Bay of Dolphins. On the northwest coast of the island, this is a small bay where several hundred spinner dolphins (*Stenella longirostris*) congregate year-round. Because of its calm and protected waters, this bay offers incredible opportunities for observa-



Off the coast of Brazil, at the Archipelago de Fernando de Noronha, is a bay where a colony of several hundred spinner dolphins congregate year-round. These amazing animals let snorkelers approach within inches and interact in what the author describes as an "acoustical ballet."

TEXT AND PHOTOGRAPHY
BY GUY PELLAND

tions and interaction with the dolphins. In 1700 there existed a French map of Fernando de Noronha that was called *Isle Delfinus* (Island of the Dolphins). It is known that this congregation of spinners has existed here for at least several hundred years.

Stenella longirostris comes from the Latin *longus* for long, and rostrum for beak or snout. Five species are known to exist: the Costa Rican spinner, eastern spinner, whitebelly spinner, Hawaiian spinner and one sub-species (announced 1977), *Stenella clymene-clymene* (short-snouted spinner). The spinners found inside the Bay of Dolphins are believed to be whitebellies and we assume they are a resident population, but even this is unconfirmed. The general coloration consists of a dark dorsal area with a lighter band below, leading to a white underbelly. The spinners are fairly small, slender animals with a long narrow snout. The lips and tip of the snout are dark. There is a single, dark eye-to-flipper stripe that is very distinctive. The males may be distinguished from the females by a usually strong keeled tail stock. The dolphin's maximum length is seven feet and adults weigh 130-150 pounds. In unexploited populations, adult females give birth to one calf every second or third year after an average ten and one-half month gestation period. The calf is weaned after it is seven months old.

Spinners received their name because of their animated and acrobatic jumping. We have seen dolphins spinning repeatedly and continuously jump and rotate in an apparent burst of exuberance. Scientists have speculated this behavior may be either a form of communication or a way to remove parasites, but maybe it's just plain fun.

We observed circular scars, and in some cases open wounds, on many of the adult dolphins, mostly around the dorsal area. These are believed to be caused by the small, cookie-cutter shark (*Isistius brasiliensis*). It is an 18 inch long parasite of porpoises, whales and large fish. This small fish has a curving row of very large teeth on its lower jaw, which it thrusts into the bodies of its victims and twists to pull out conical plugs of skin and flesh. A few of the calves had scars or wounds on their underbellies, not around the dorsal area. In our observations, calves spend a lot of their time under their mothers. If this continues in deeper water where the dolphins feed, then the calves' dorsal area would be protected by the mothers' belly, leaving only the abdominal area open to the shark. The cookie-cutter shark is epipelagic—found in all oceans—mainly in tropical waters and lives in depths of less than 2,000 feet. Until the cookie-cutter was discovered in 1971 the circular scars on dolphins and whales were believed to be caused by bacterial infection.

We believe the Brazilian dolphins are nocturnal feeders. They move inshore in the morning, after eating, to rest in the shallows. The nocturnal feeding behavior could not be observed, but during the day no feeding was observed while the dolphins were in the bay. The dolphins spent most of the morning in small groups: mother/juveniles, mother/calves/escorts, mating males/females (at times four to six males courting one female), and small groups of juveniles. All would depart the bay between 1:00-3:00 pm.

We tried to beguile the dolphins with underwater scooters, scuba gear, balls, hoops, toys and music, but they would leave us after just a momentary glimpse. The hum of the scooters, the exhaust from the regulators and music only seemed to alienate them. Finally we chose to use mask, fins and snorkel and tried to become part of the environment. After a few days the dolphins became accustomed to our presence and exhibited as much curiosity about us as we did for them. Within a short while the mothers were allowing the calves to venture close to us—without the escort—and all around us others were mating. These reactions have led us to believe the Bay of Dolphins is a major breeding, calving and social gathering area, where only certain behavioral patterns are accepted.

It was heartwarming to observe the emotional bond between mother and calf. There was also tenderness and affection displayed between the mating couples. Spinners have been described as easily frightened, fearful of objects, highly dependent on the presence of other dolphins and not easily induced to allow themselves to be touched. This group of spinners allowed us to approach within inches of mating couples and calves. Some of the juveniles would greet us each morning, eager to continue with our games. We were able to identify five dol-







BAY OF DOLPHINS

phins because of the scars. Although we were unable to physically touch the dolphins, we were touched much deeper.

Although we were strangers to their world, they allowed us to approach and share their domain. At no time was there any sign of aggression, only an acoustical ballet and their ever-present grins. On Noronha there was incredible trust between dolphin and man—a need and a want to communicate—and we hope, the mutual fulfillment of contact.

In February 1986 the Brazilian government announced it was considering developing a major international tourist complex on the Fernando de Noronha Archipelago. The government had not considered the environmental balance. It has been consistently proven that the greater the extent of human development on land, the greater the decline in the quality of coastal ecosystems. In hopes to help slow this development, an organization known as the Comite Pro Parque Nacional Marinho de Fernando de Noronha was founded. Headed by Russel Wid Coffin and including Jose Truda Palazzo, Jr., Maria de Carmo, myself and the Department of Parks and Wildlife Fund (WWF), the committee hopes to show the Brazilian government that Brazilians and the international community alike could only benefit from the preservation of this wonderful archipelago. To date we have more than 150 conservation organizations from around the world sending letters in support of a marine park for Fernando de Noronha. Through the committee we have been able to persuade the government to reduce the size of the tourism project and agree to have more than one-half of the island declared a marine park, with no development or construction to take place.

Fernando de Noronha and the Bay of Dolphins offer a unique opportunity for the scientific community to study a group of animals in its own environment. Cetaceans are particularly intelligent animals, adapted to a complex environment. Any change within that environment can seriously disrupt the social organization.

For generations cetaceans' encounters with man meant death. In today's ever shrinking world, is it not time for us to allow these creatures a place on this earth, a place they can call home?

VAS airline flies to Fernando de Noronha every Sunday from Reciefe, Brazil. For more information on diving contact: Russel Wid Coffin, Aquas Claras Produceos Submarinas Ltda., Rua Dr. Luis Plamier, 280 Barreto, 24110 Niteroi R.J., Brazil.

Editor's Note: Last summer Russel Coffin invited the Jack McKenney film crew to Brazil. The Bay of Dolphins *premiered*

at DEMA in January and will be shown at underwater film festivals throughout the U.S. this year.

PELOZA/SHERWOOD

Tim Peloza has joined Sherwood, a division of Harsco Corporation, as assistant product manager. With this new appointment, he will be assisting in the scuba, life support and compressed gas product lines.

Peloza was formerly a sales manager with Pressed Steel Tank Company, Inc. and holds a degree in economics from the University of Wisconsin.

Sherwood is a manufacturer of precision valves, regulators and fittings for the gas industry. It manufactures components for breathing apparatus used in the medical profession, aerospace market and scuba diving.

DECOMPRESSION COMPUTER WORKSHOP

Decompression computers will continue to gain acceptance as accurate, convenient and, eventually, inexpensive devices for determining decompression status when performing multi-level dives, according to Michigan Sea Grant researcher Karl Huggins. He is a widely recognized authority on decompression theory and co-inventor of the Edge decompression computer.

Huggins made his remarks at the Undersea Medical Society Workshop, Decompression in Surface Based Diving, held recently in Tokyo, Japan, where he was invited to present a talk and a technical paper about the pros and cons of decompression computer use.

In addition to Huggin's presentation, the 47 workshop attendees from the United States, Canada, Great Britain, Norway, Switzerland, Hong Kong and Japan listened to other experts explain different decompression theories, models and practices developed for surface-based diving using air.

The workshop was organized by Dr. Ed Lamphier of the University of Wisconsin, Madison, and Dr. I. Nashimoto of the Saitoma Medical School in Japan. Huggin's decompression theory work is sponsored in part by the Michigan Sea Grant College Program, a cooperative effort between The University of Michigan and Michigan State University.

Proceedings of the workshop will be available from the Undersea Medical Society soon. Contact the Society at: 9650 Rockville Pike, Bethesda, Maryland 20814.

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MAGNUM II

SHERWOOD MAGNUM II



TEXT AND PHOTOGRAPHY BY ERIC HANAUER

Sherwood introduced three regulators during 1986. Two of them, the Oasis and the Shadow Octopus, were covered recently on these pages. This month we will examine the Magnum II, Sherwood's top gun, high-performance regulator.

The Magnum has received a major facelift, both mechanically and aesthetically. It now features first stage porting increased by 70 percent, and a new, high-capacity second stage hose for better airflow. Its Lexan® plastic second stage housing has been beefed up and smoothed inside for better airflow. The new splined bezel gives it a high-tech look, to go along with its five color choices. As a result of the engineering changes, the new Magnum offers an increase in performance at depth and low tank pressures over the old model.

Readers of the earlier report (SDM September 1986) will recall the Oasis is a Magnum II with moisturizing vanes added. Some divers were sensitive to the Magnum's dry breathing characteristics, so Sherwood engineers added a pair of nickel plated copper fins curving from the valve body to the mouthpiece. They condense the moisture in exhaled air, then return it with the next inhalation. However, no gain comes without a price. In this case, the vanes change the flow characteristics of the second stage housing, causing more turbulence. Without the vanes the Magnum II breathes more easily, so easily it approaches the performance levels of far more expensive regulators. In my diving evaluation, I didn't find the Magnum II's dry breathing objectionable. Someone more sensitive might opt for the Oasis; that's why Sherwood is offering a choice. The world would be pretty dull if everybody liked vanilla.

Al Thompson of Professional Scuba Repair, North Hollywood, California is one who prefers the Magnum II's performance. "It's an excellent breathing regulator, especially for the price," he states. "The first stage piston is perfectly balanced . . . there is no difference (in first stage pressure) between a full and an empty tank."

Sherwood provides a unique form of environmental protection for its first stage. The major disadvantage of a balanced piston first stage is the interior is exposed to water and all the foreign matter suspended in it. Eventually, this takes its toll on delicate O-rings and valve seats. In cold water, air rushing through the mechanism can cause icing and freeze-up, even at temperatures above freezing. Sherwood's solution is to keep the water out entirely by maintaining a pressure of one to two psi over ambient within the spring cavity. This is accomplished by a small opening in the main piston that allows intermediate pressure air to bleed into the ambient pressure chamber. When it builds up to one and one-half psi over ambient, a thin, steady stream of tiny bubbles is released through a rubber check valve. This valve looks like a rubber plug, set between the high pressure port and an adjacent low pressure port. A tag packed with the Magnum II informs the customer that the bubbling is a normal part of the regulator's operation, so don't mess with the bleed valve. Don't worry about the small amount of air trickling out. It is only 14 cc per minute, the equivalent of three or four breaths over the course of a dive.

Sherwood's new hose offers the benefits of greater airflow by having an enlarged orifice while retaining the standard three-eighths inch fittings. Therefore, it is still compatible with earlier models. For added strength, all hose fittings are now stainless steel instead of chromed brass.



The second stage features a plunger that keeps the purge button depressed during storage (right side of case cover).

The Magnum II first stage (above left) has one high pressure port and three low pressure ports. An overpresssure device provides environmental protection. The second stage (above) has a friction-reducing roller on the downstream valve lever.

According to Thompson, the new second stage design is the most significant improvement over the original Magnum. The case now allows better air circulation and a more efficient angle of air entry into the mouthpiece. Nearly all sharp corners have been rounded off, significantly reducing turbulence within the case.

In keeping with the current trend toward color coordinated dive gear, the case and cover are available in your choice of blue, yellow, black, pink or lavender. The last two colors are new.

Aside from the missing moisturizing vanes, the Magnum's second stage shares all the features of the Oasis. The cover is easily removed (for cleaning out sand and foreign matter) by removing a small retaining clip and unscrewing the splined ring. A roller at the end of the downstream valve lever reduces friction against the diaphragm plate, resulting in lower cracking effort. For storage, a stainless steel plunger is built-in, which keeps the purge button depressed. This releases pressure on the valve spring and prevents the downstream valve seat from taking a set.

We tested the Magnum II during two dives off the coast of Palos Verdes, California. One was a 100 foot deep wreck dive to determine performance at depth, the other was in a shallow kelp forest to evaluate other functions. The Magnum II was attached to one side of Sherwood's unique slingshot tank valve, with my reference regulator attached to the other side. Originally designed for cave and wreck diving, this valve is ideal for regulator comparison.

The overall impression of the Magnum II was one of quiet competence. Cracking effort (the amount of inhalation needed to get airflow started) was very low and air volume was sufficient. It performed nearly as well as my comparison regulator, which costs more than $100 more.

The Magnum II generally breathes dry, but not excessively so. There was no "cotton mouth" feeling. When I was on my back, looking upward, it leaked a little bit of water. Most regulators exhibit this characteristic, but that should be of concern only to people who scrub boat hulls for a living. Clearing the second stage of water required just the smallest puff of air. Pushing the purge button results in a medium powered blast, more than sufficient to do the job.

When gently sipping air, it came smoothly and easily with a natural feel. Hard swimming and heavy breathing at depth also resulted in easy, sufficient airflow, even at low tank pressures and while octopus breathing. This test separates the high-performance regulators from the average ones and the Magnum II definitely belongs in the top category.

Freeflow occurred when the regulator was removed with the mouthpiece up. It was hard, not violent and stopped as soon as the mouthpiece was turned down. Sometimes it resumed when the mouthpiece was turned up again and sometimes it just released a trickle of bubbles, one at a time. Most regulators, when the second stage is in a state of balance, won't freeflow again. This isn't a real problem with the Magnum II, just a point of interest.

Exhalation effort was a bit high. This is not uncommon in dry breathing regulators. They breathe dry because the exhaust valve is stiff enough to prevent water from leaking in.

The only element detracting from the Magnum II's all-around feeling of competence was its mouthpiece. Apparently this has been enough of a problem that a new, smaller, softer mouthpiece should be available by the time you read this.

The Magnum II is Sherwood's regulator of choice for the diver whose priority is top performance. At $230, it is also the lowest priced of the Magnum series. The Oasis, with moisturizing vanes added, is $10 more. The Blizzard, with Teflon® coated components for ice diving, adds another $5. All come with a lifetime warranty that covers all parts as long as authorized annual maintenance is performed. Check out the one that meets your needs at your Sherwood dealer.

MAGNUM II

First stage:	
Type	Balanced piston
Maximum pressure	3,500 psi
Materials	Chrome plated brass body Teflon seat
High pressure ports	One, 7/16" diam.
Low pressure port	Four, 3/8" diam.
Environmental protection	Standard overpressure device
Hose length	31 inches
Second stage:	
Type	Downstream, lever action
Materials	Case and cover: Plastic Diaphragm & exhaust valve: Silicone Mouthpiece & exhaust tee: PVC
Colors	Yellow, blue, black pink, lavender
Features	Storage button built-in Roller action lever
Warranty	Limited lifetime, incl. parts
Price	$230

Technifacts

BY E.R. CROSS



Frequently, media coverage relates near horror stories about happenings in nuclear power plants. Coverage about the Three Mile Island and Chernobyl plants and their radioactivity problems would cause doubts about any kind of work being performed safely in the vicinity of such facilities. How can divers, clad in near conventional commercial diving equipment, work in radioactive water? With difficulty, but it can be done.

Historically, diving in radioactive water is not new. Probably the first such underwater work was at Bikini Atoll following Test Baker of Operation Crossroads on July 25, 1946. This was an underwater explosion of an atomic device with a yield equivalent to 20,000 tons of TNT. According to reports, the damage to military vessels and equipment was approximately as expected. However, radioactivity in the water of the lagoon and onboard the vessels from millions of tons of water thrown into the air by the blast was much higher than anticipated. This presented major problems in working on target vessels and in the surrounding water.

To cope with this particular problem a decontamination vessel was established. After working in contaminated water or on radioactive vessels, personnel boarded the vessel on what was called the "sour" side. They then passed through decontamination procedures. When "clean," personnel passed to the "sweet" side of the ship and debarked for their own vessels.

TOC SAFETY PROCEDURES

The Ocean Corporation, a Houston, Texas based commercial diving company, maintains a safe practices manual and enforces its tenets. TOC also provides in-house safety training and training in operations procedures including those related to nuclear diving. And, that is only the beginning. According to Steve Venable, one of TOC's qualified nuclear dive team project managers, "Every member of the nuclear dive team must be retrained and requalified before leaving Houston for work in the reactor pools." TOC's nuclear dive crews are trained additionally in special U/W test facilities at the reactor plant where most required work projects can be simulated.

The Ocean Corporation feels the most cost effective underwater work is performed by divers in the water, in spite of that water being radioactive. The late Larry Cushman (president of TOC at the time of this interview) stated, "We have developed a high level of technical capability in some very specialized areas of commercial diving, including dry equipment for radiological and toxic environment diving." Later Cushman added, "The Ocean Corporation has a distinguished record of achievement in our industry, including the first diving operations in containment in a nuclear power plant. This was a job at Palisades, Michigan, in 1973, that involved a reactor vessel snubber shim replacement. We have safely continued similar work since that time." Records indicate TOC divers and surface support personnel have accumulated more than 12,000 on-site manhours and 7,000 manhours in containment while completing more than 300 dives, some lasting three hours in spent fuel pools and adjacent areas. These dives were carried out without incident.

In addition to replacing snubber shims, jobs accomplished include: replacement of shroud tubes and sensors; recovery of remotely operated tools; leak repairs in storage tanks, condenser boxes and pool liners; modification of sparger nozzles and torus tubes; complex repair and change-out projects on spent fuel transfer/storage systems.

For a well qualified commercial diver most of these jobs are not particularly complex or difficult. The water in the pools is never very deep. Visibility is good. There are always support teams of well qualified personnel. Steve Venable told me, "In most commercial diving the diver becomes physically tired. Reactor diving causes more psychological stress than physical fatigue. Divers working at a reactor site are under a lot of stress. They must always exercise a lot of self discipline and follow all safety procedures to the letter." In commercial diving there is always a sense of obligation to the customer to work effectively and economically. "In reactor diving, the primary objective is safety."

DIVING PROCEDURES

The Ocean Corporation's diving procedures are best described in their in-house publication, *Using Divers for Nuclear Plant Maintenance*. This eight page instruction manual states, "Standard commercial diving safety precautions and regulations remain in force at all times. Any other precautions or regulations that may be imposed by conditions at a particular dive site are also enforced." All nuclear diving operations performed by TOC are conducted in accordance with the safety rules and regulations set forth by the Association of Diving Contractors (ADC), OSHA, the U.S. Coast Guard and applicable NRC and/or DOE regulations. Individual divers are sometimes required to pass special customer-provided medical examinations in addition to those specified by the regulations above.

The Ocean Corporation's manual, *Using Divers for Nuclear Plant Maintenance*, details procedures to be followed by nuclear dive teams and, also, information that will generate complete cooperation between dive teams and customer supervisors and employees. In addition to diver qualifications the procedures include subjects such as: dive planning, scheduling and record keeping; diving procedures; and emergency procedures. Not so strangely, the procedures include many of the things a sport diver does to prepare for and conduct a safe dive. The biggest difference between a sport dive checklist and nuclear dive preparation is the greater, in-depth detailing of plans and procedures. In safe sport diving, a diver can change his/her plan to adjust to environmental conditions or even abort the dive if conditions indicate this should be done. In nuclear diving plans and preparations must be developed so conditions will remain stable and the job completed as planned. There are usually no alternatives.

One of the things a sport diver does in planning is to determine depth and then duration of the dive to accomplish its purpose while avoiding in-water decompression stops. The dive team also keeps records to permit additional repetitive dives if possible. In nuclear diving this kind of planning is carried much farther and is called "Project schedule and task completion time evaluation." Some of the additional factors that enter into scheduling a nuclear dive project would be available work time and constraints owing to the high costs of plant down time, exposure restrictions in regard to radioactivity and

(Continued on Page 114)

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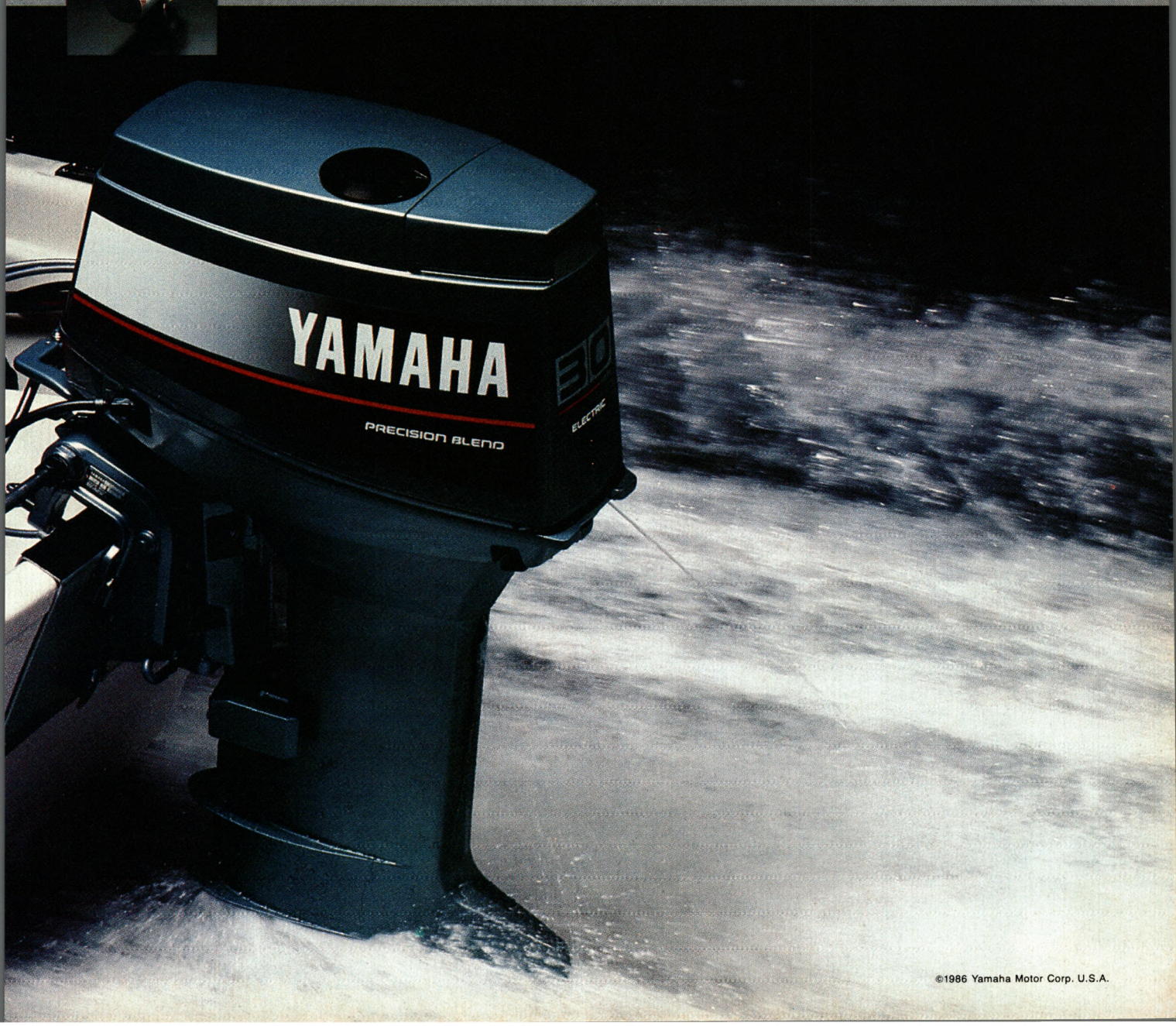
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CEDAM INTERNATIONAL CELEBRATES 20TH ANNIVERSARY

BY RICK SAMMON

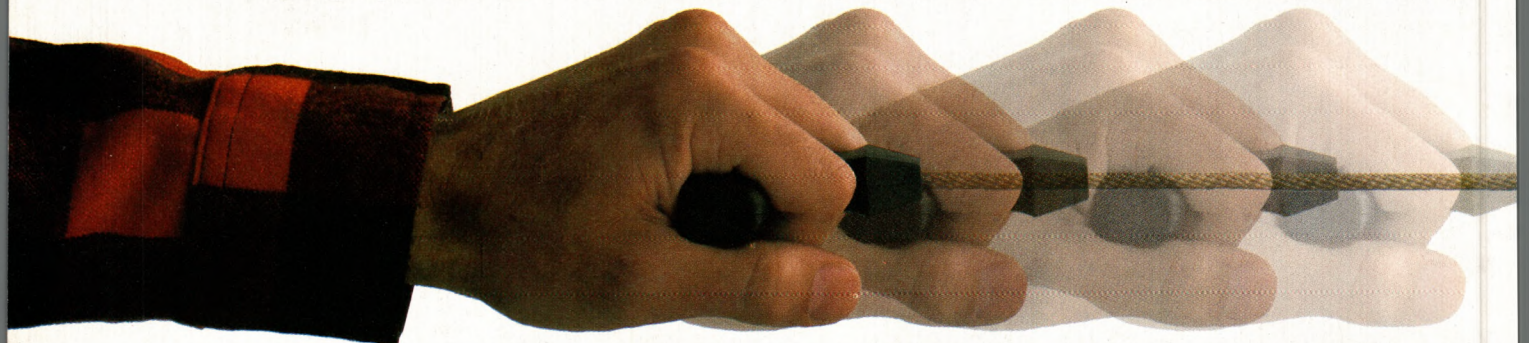
Twenty years ago, Texas businessman and explorer Don Pablo Bush Romero, along with Chuck Ennis, founded CEDAM International—a non-profit, tax-exempt organization. Since 1967, CEDAM International has made significant contributions to the fields of Conservation, Education, Diving, Archaeology and Museums. Today, it is one of the most respected, conservation-minded organizations in the diving community.

CEDAM International is comprised of novice and experienced divers, explorers, underwater videographers and photographers, and skilled and amateur archaeologists and marine biologists. Well-known members of the organization include inventor Ed Link, explorer Peter Gimble, archaeologist Mendel Peterson, astronaut Scott Carpenter and marine biologist Dr. Ernie Ernst. Michael J. Kelly, chairman of the President's Cultural Property Advisory Committee, is also the chairman of CEDAM International. Membership in CEDAM is open to all divers with a willingness to learn, as well as a desire to be a team player on the expeditions. All expeditions are led by professional archaeologists and biologists.

EARLY EXPLORATIONS

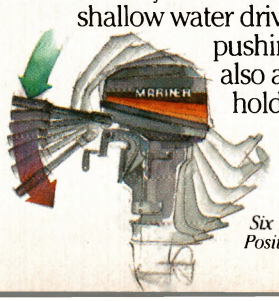
In the 1960s, Pablo, now in his 80s, led CEDAM expeditions to the Sacred Well of Chichen Itza in Mexico. The National Geographic Society and the National Institute of Anthropology and History also

You'll Never Reach The End Of



Every once in a while a fisherman will tell you a story that's hard to believe. But in the case of the new Mariner 9.9, it's no brag, just fact. Our new 9.9 starts with a pull of just 6 inches. And the story grows from there.

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If you'd like an outboard that starts easy and hangs tough for years to come, look at the new Mariner 9.9. For the name of a dealer near you, write: Mariner, 1939 Pioneer Road, Dept. FO, Fond du Lac, WI 54935.

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worked on this expedition, which resulted in the recovery of Maya artifacts. Pablo also organized expeditions to the Sacred Cave of Xel-ha and the Sacred Lake of the Half Moon in Mexico.

In the 1970s, expeditions were mobilized to study the Maya ruins at Tulum, on the Yucatan Peninsula, and the ruins at Coba, farther inland. Underwater exploration of the coastal waters of the Yucatan was also conducted.

CEDAM also launched a major shipwreck reconnaissance expedition to the Chinchorro Bank, Mexico. Several anchors, cannon and ballast piles were located and photographed.

Of particular interest to the CEDAM International divers was the Forty Cannon wreck, discovered in about 25 feet of water. For many, this was the first exposure to a shipwreck site.

The 1980s have taken CEDAM to the small islands of Laughing Bird Cay and Ranguana Cay in Belize, C.A., to study 16th century Spanish shipwrecks. CEDAM also explored the Lost City of Nueva Cadiz, on the island of Cubagua, Venezuela. This was the first Spanish city in South America.

Artifacts recovered by those on past Mexican expeditions have been placed in the CEDAM Museum in Xel-ha, Mexico. Artifacts recovered on the Nueva Cadiz project are in the CEDAM International Museum on Margarita Island, Venezuela.

During the past two years, CEDAM has also mobilized successful live fish collecting expeditions to Honduras and the Red Sea. And, as recently as last October, after a reconnaissance expedition to the Galapagos, the organization's plan to develop a 10 year program to study the marine life of these islands was approved.

The success of all the CEDAM expeditions for the past 20 years has been owing to the volunteer members and expeditioners, who donate their time and talents to the success of the project.

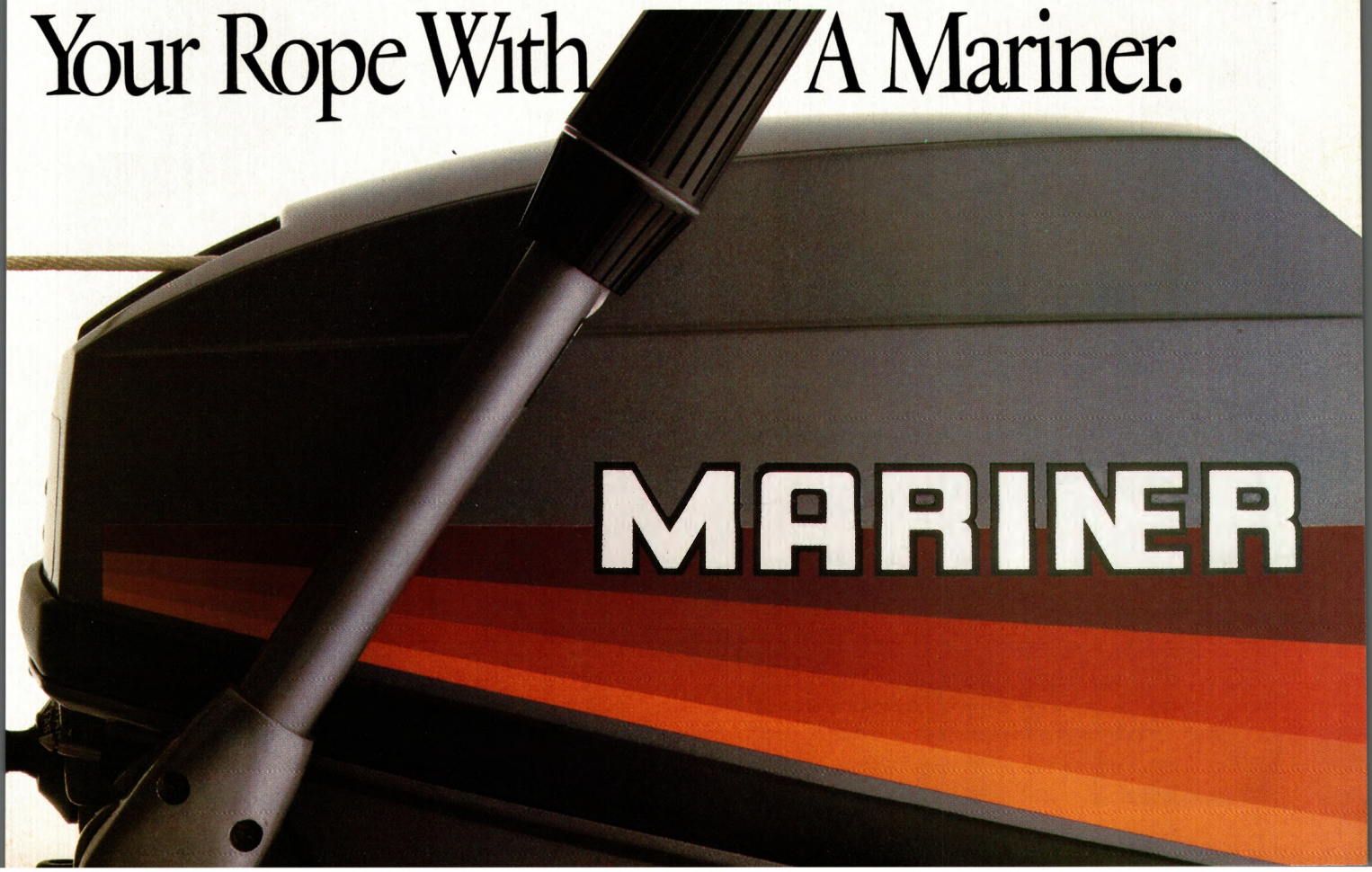
FUTURE PLANS

The next few years will be very important for CEDAM. The organization is currently helping the Wildlife Conservation International organization, a division of the New York Zoological Society, to set up the Hol Chan marine park in Belize. CEDAM is also continuing its work at Anthony's Key in Honduras and is working with See & Sea Travel on Red Sea collecting expeditions. Expeditions to the Galapagos, Statia and New Guinea, plus a safari to Africa to study the black rhino, are also being planned.

All of us at CEDAM are very excited about the possibilities for the organization. Pablo Bush, along with co-founder Chuck Ennis, had a dream 20 years ago: A dream to build an organization of conservation-minded individuals who wanted to contribute to the marine and archaeological sciences. Today, the new CEDAM International team shares this dream, and with the help and support of our members, we can continue the important work that Pablo and Chuck started.



For more information on how you can participate in CEDAM expeditions, and a copy of its newsletter, Reef Report, write CEDAM International, Dept. S, Fox Road, Croton-on-Hudson, NY 10520. Please enclose $1 for postage and handling. Expedition expenses are tax-deductible. Expedition costs range from $700 to $3,000 per person.



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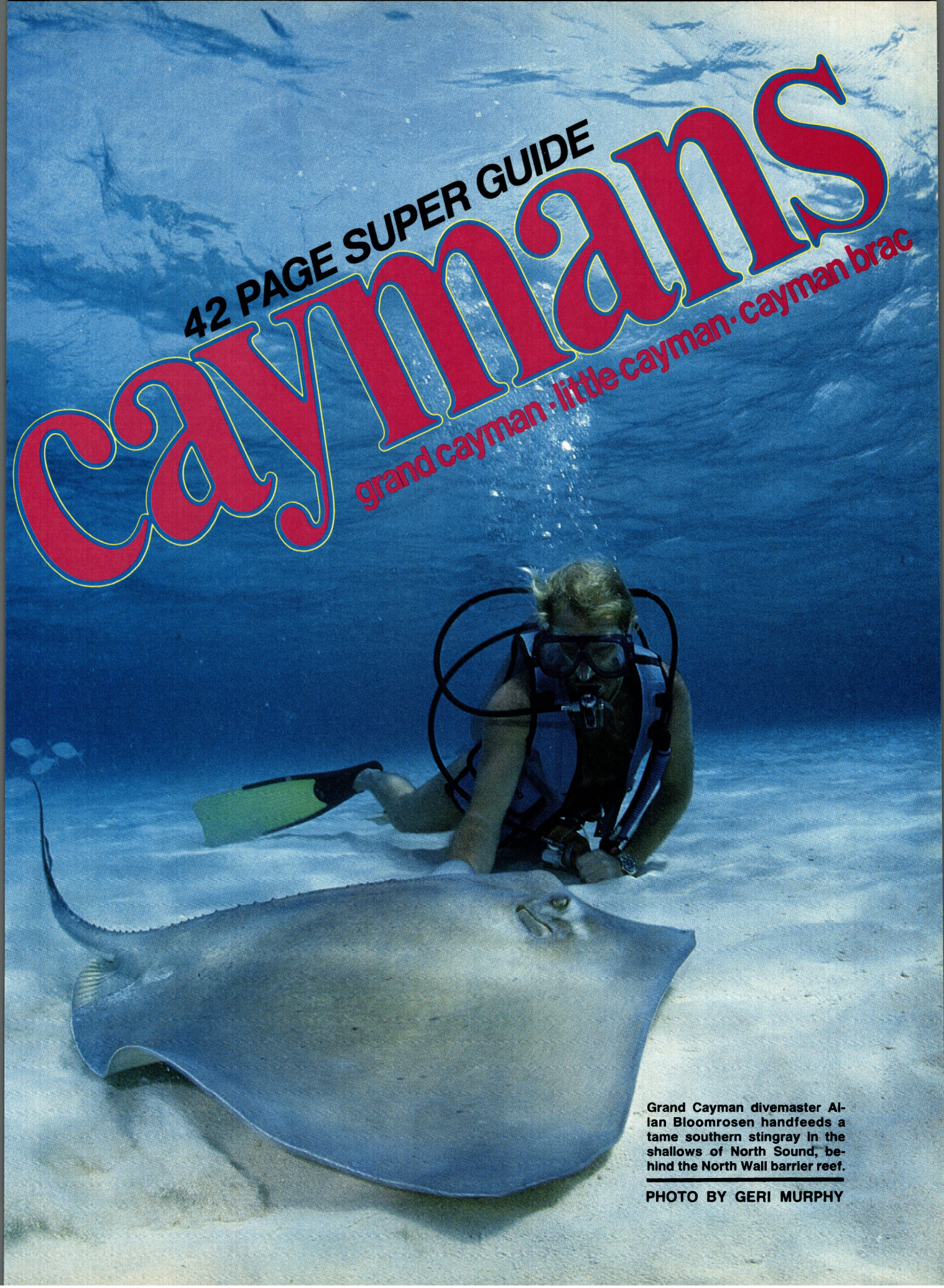
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42 PAGE SUPER GUIDE

cayman

grand cayman · little cayman · cayman brac



Grand Cayman divemaster Allan Bloomrosen handfeeds a tame southern stingray in the shallows of North Sound, behind the North Wall barrier reef.

PHOTO BY GERI MURPHY

cayman islands

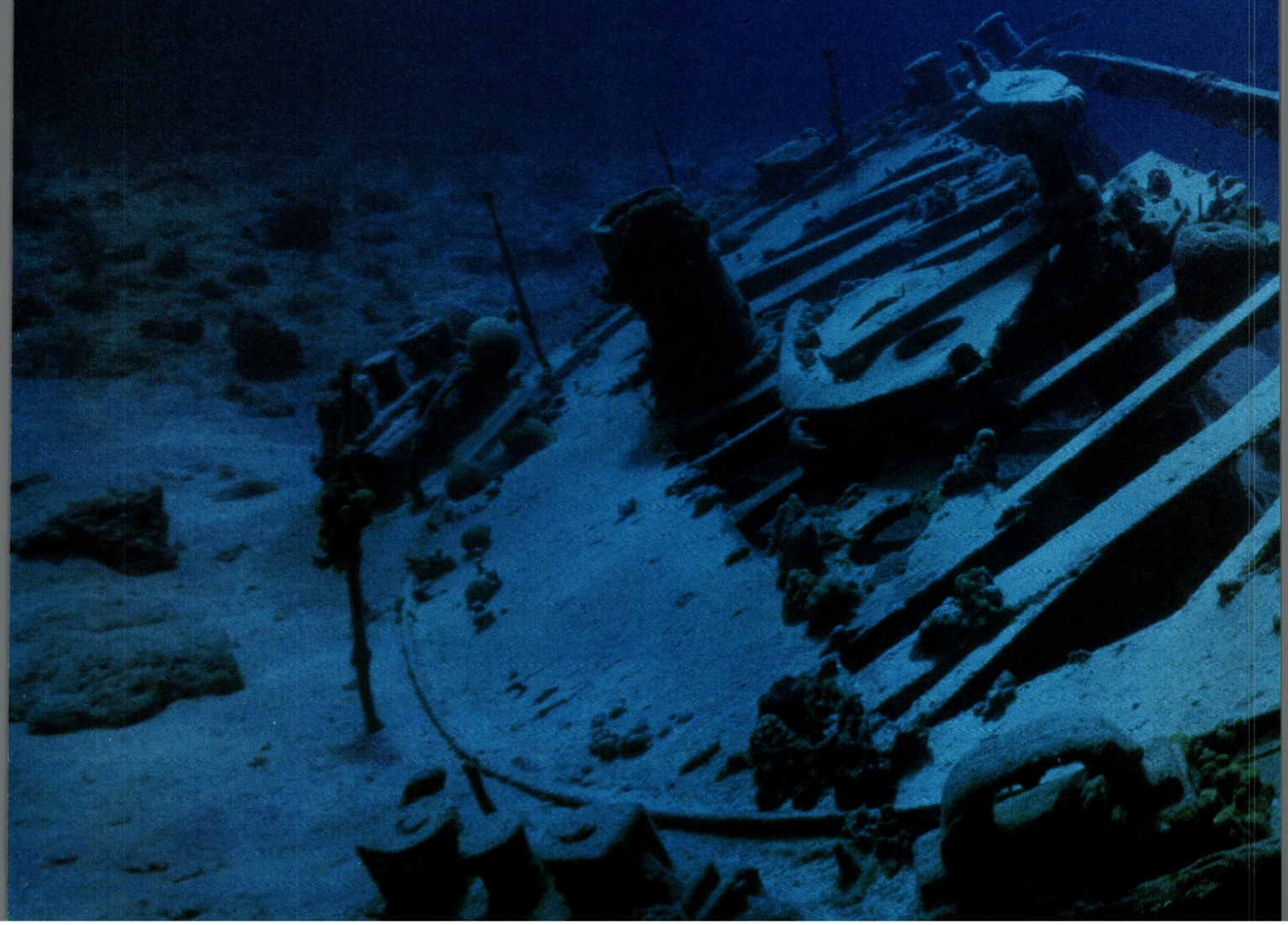
the summit of diving adventure

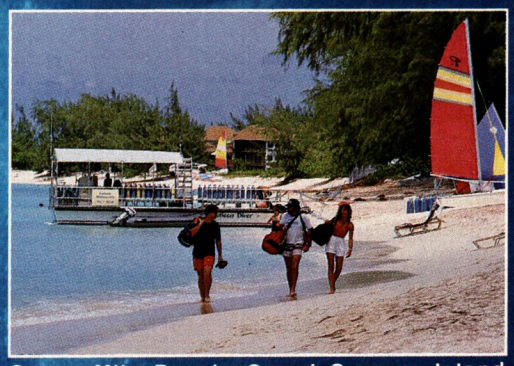
More than 100 million years ago a violent earthquake shook the Caribbean Basin and a newly formed mountain pushed its way toward the ocean surface. It rose more than 16,500 feet from the deepsea floor, barely poking its highest peaks into the earth's turbulent atmosphere. Today, the summit of that immense undersea mountain is known as the Cayman Islands—three small dots in a vast blue sea.

Yet, the Caymans are far more than a geologic phenomenon and even more than a vacation paradise. To divers the world over, the Caymans are regarded as a different kind of summit. They represent the ultimate culmination of diving adventure. These tiny islands offer more kinds of diving experiences than any other place on earth. There is something for everyone.

Grand Cayman island is the largest and most developed of the three. It is one of the most progressive and exciting islands in the entire Caribbean. There is a carnival atmosphere of rapid development and prosperity. New hotels and lav-

TEXT AND PHOTOGRAPHY BY GERI MURPHY

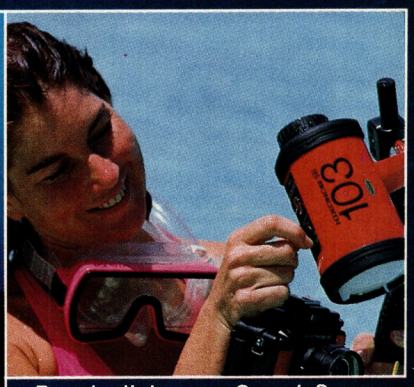




Seven Mile Beach, Grand Cayman Island



Jackson Point, Little Cayman



Beach diving on Grand Cayman



Waldo's Reef, Grand Cayman



Snapper Reef off Cayman Brac

A diver swims across the stern of the *Balboa* wreck in George Town Harbour.

caymans

ish condos are under construction, while enterprising entrepreneurs are establishing submarine rides for curious divers and wide-eyed tourists. Restaurants and bistros are sprouting like mushrooms and major dive operators continue to build up fleets of dive boats. The island is a beehive of activity that can only be compared to the boom towns of gold rush days.

Yet, Grand Cayman has not lost its island appeal. The residents are friendly, talkative and happy to see American visitors. For divers, Grand Cayman offers a smorgasbord of undersea experiences. There are more than 27 dive facilities and they offer every conceivable diving service one could desire.

Eighty-five miles northeast of Grand Cayman is the little island of Cayman Brac. It is smaller in size, relatively undeveloped and possesses a rural atmosphere. The Brac is on the frontier of future tourism development. The population is approximately 1,100 and there are only three small beachfront hotels. A newly expanded airport facility now accommodates 727 jet flights direct from Florida. For the visiting diver, Cayman Brac is a tantalizing combination of virgin reefs coupled with the creature comforts of well run hotels. While this island lacks the excitement and flash of nightly entertainment, it also offers privacy and freedom from traffic jams.

Less than one mile from Cayman Brac is Little Cayman. It is equal in size to the Brac, but has a population of less than 50. Little Cayman is still an undisturbed island wilderness, complete with a grass strip runway, unpaved roads and no air-conditioning. The accommodations are more like fishing camps than full service hotels. This island offers a very special kind of vacation, where a visitor can get close to nature and attain the ultimate in tranquillity. It offers a marvelous opportunity to observe sea birds, iguanas and turtles. Life here is almost the same as when Columbus sailed past in 1503.

LOCATION

The Cayman Islands are close, convenient neighbors to the U.S. and easy to reach. The advent of direct nonstop jet service has placed these tiny islands within commuting distance of several major U.S. cities. They are only 495 miles south of Miami, with a flight time of less than one and one-half hours. Houston is only 1,220 miles away and the flight takes two and one-half hours.

The Caymans are on approximately the same latitude as Cozumel, Haiti and the Virgin Islands. It is this tropical location that accounts for their balmy weather, sunny winters and warm waters. Yet the islands are far enough from any major land mass to avoid the murky water connected with rain runoff, river outflows or industrial pollution. The Caymans are basically flat coral islands circumscribed by thin ribbons of living coral reefs.

AIRLINE SERVICE

Three airlines operate nonstop flights in and out of Cayman: Cayman Airways, Northwest Airlines and Air Jamaica.

Cayman Airways is the official flag carrier for the Caymans and has been operating for more than 14 years. It is the airline most identified with diving, as it has participated in a wide variety of diving programs, dive tour packages and special events throughout the years. Cayman Airways also operates more flights per week from more U.S. cities to the Caymans than any other airline.

Cayman Airways operates nonstop 727-200 jet flights from Miami to Grand Cayman twice daily (every day) with an extra evening flight on Mondays. Departures from Miami are conveniently spaced for early morning and afternoon, thus allowing good connections with incoming flights from other U.S. cities. Most divers traveling from the East Coast or Midwest use the Miami connection.

Cayman Airways also operates nonstop 727-200 jet flights from Houston to Grand Cayman four times weekly in the winter. This service departs Houston early afternoons on Thursdays, Fridays, Saturdays and Sundays. For travelers from California, the Northwest or Midwest, Houston makes an ideal connection.

Cayman Airways now operates 727-200 jet service from Miami to Cayman Brac three times weekly. This is exciting news to divers who wish to avoid plane transfers and baggage delays. Cayman Airways also operates a Trilander commuter air service between Grand Cayman and Cayman Brac six days per week and between Cayman Brac and Little Cayman four days per week.

In addition to their regularly scheduled flights from Miami and Houston, Cayman Airways aircraft and flight crews are used for special charter flights. The charters run on a weekend schedule from such major U.S. cities as New York, Detroit, Chicago, Philadelphia, Baltimore, Minneapolis and Atlanta. They are only operational during Cayman's winter season, from mid-December to mid-April. For more information, check with your local travel agent or check the advertisements in SKIN DIVER.

Northwest Airlines operates two nonstop DC-9 jet flights daily from Miami to Grand Cayman. In addition to the 14 flights per week, Northwest offers the advantage of airline connections with other Northwest flights throughout the Midwest and East. These connections include such major U.S. cities as Minneapolis, Detroit and Atlanta.

Air Jamaica flies from Kingston to Grand Cayman several times weekly and from Montego Bay once a week. It is possible to fly from Miami to Grand Cayman via a Jamaica connection by utilizing Air Jamaica's frequent flight schedule.

RECONFIRM

Once you have landed in the Caymans, it is extremely important you reconfirm your return flight reservations. While departure arrangements may be the farthest thing from your mind, reconfirmation is best accomplished at the time of arrival. It can be done right at the airport, at the downtown ticket office or by telephone. The airlines require you reconfirm your flight reservations 72 hours (three days) in advance of departure.

ENTRY

While enroute by air to Cayman, you will be given an immigration entry form.

AIRLINE RESERVATIONS & FLIGHT INFORMATION

	Nationwide Toll Free
Air Jamaica	(800) 523-5618
Cayman Airways	(800) 422-9626
Northwest Airlines	(800) 441-1414

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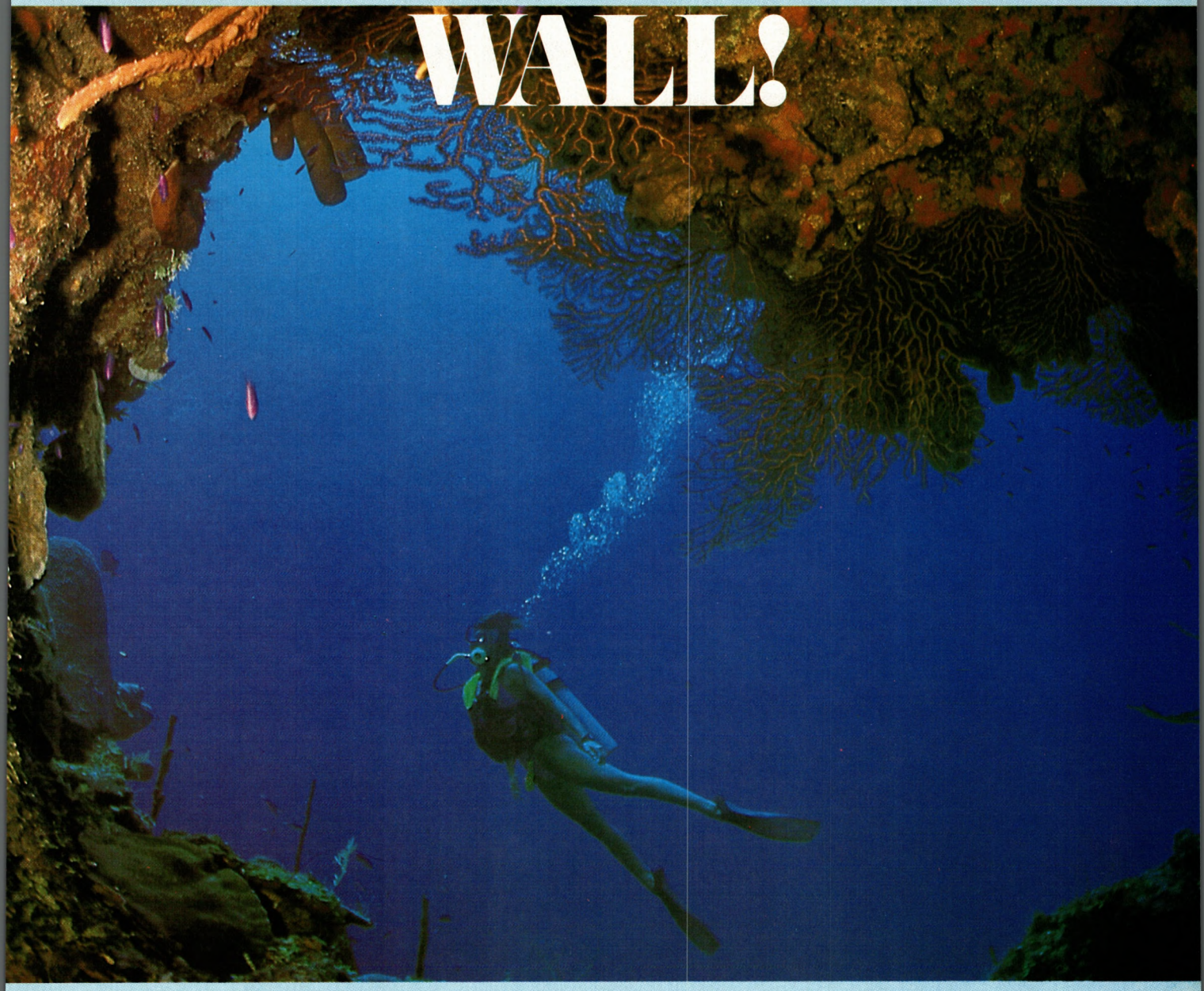
Cayman Express	(800) 262-7686
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Travel Impressions	(800) 843-6062
Twin City Tours	(800) 328-3786
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CURRENCY EXCHANGE RATE

U.S. Dollars	Cayman Dollars
$ 1.00	$.80
2.00	1.60
5.00	4.00
10.00	8.00
20.00	16.00
50.00	40.00
100.00	80.00

Cayman Dollars	U.S. Dollars
$ 1.00	$ 1.25
5.00	6.25
10.00	12.50
25.00	31.25
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Those who know us, love the safe, beautiful diving along the majestic vertical walls surrounding our three Islands. The magnificently colorful sponges, corals, and friendly marine life that thrive in our crystal clear waters. And the drop-offs that make our Islands a superstar among dive destinations. The Cayman Islands are a sunny, magical trio of islands nestled in the British Caribbean. The whole world doesn't know us. But those who do, love our Islands for exciting underwater adventure, as well as for our highly professional dive shops and schools. They also love our people, whose warmth and attention to your needs make a vacation here unforgettable. Getting here is easy. We're just over an hour from Miami, two and a half hours from Houston via frequent jet service flights on Cayman Airways. Call your travel agent or Cayman Islands Department of Tourism. Beginners and experts alike will find that our enthusiasm for diving runs as deep as our Wall!



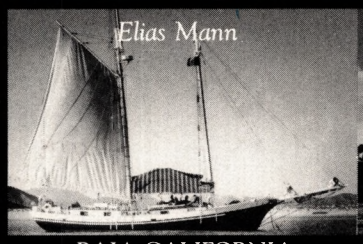
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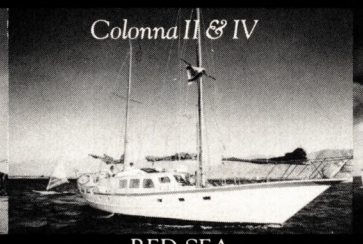
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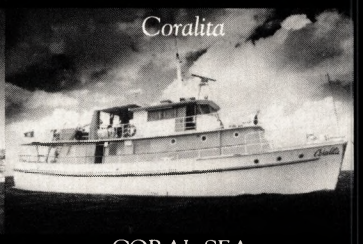
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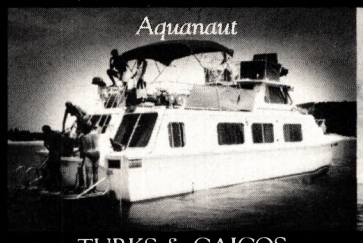
PALAU
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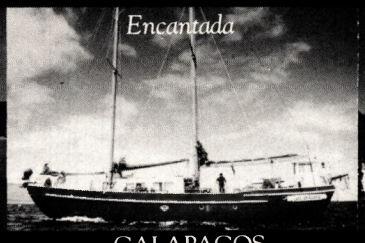
RED SEA
10 days $1600



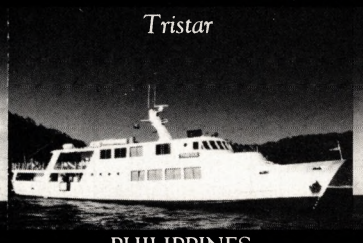
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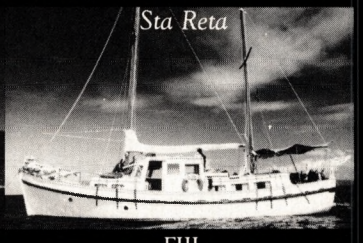
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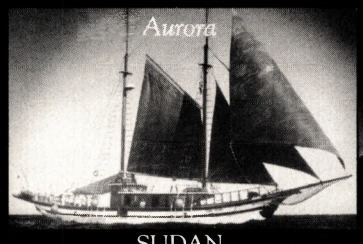
GALAPAGOS
11 days $1900/17 days $2900



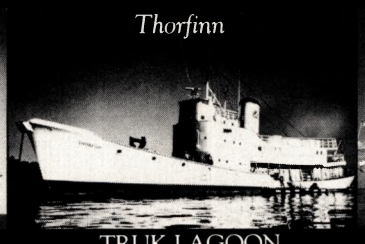
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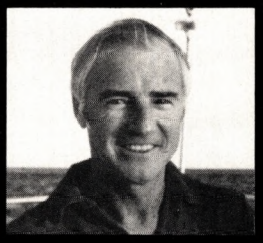
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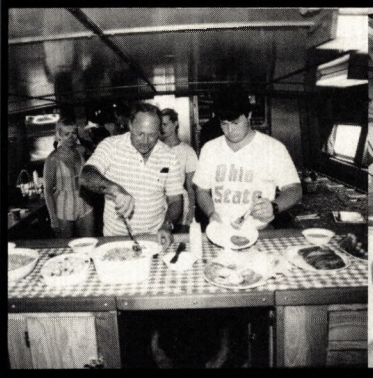
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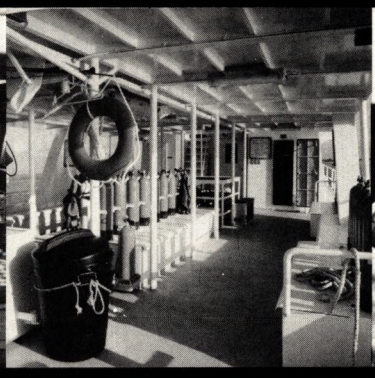
Dive Adventures!



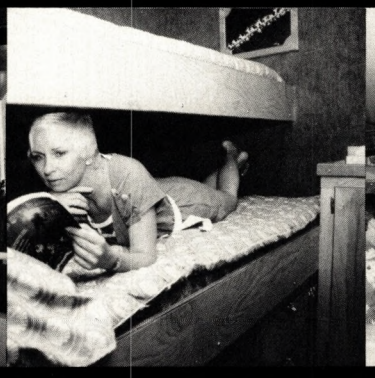
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Essentially, the *Aggressors* are luxury floating resorts offering all the amenities of the very best shore-based hotels, including sundeck, private, air-conditioned staterooms, a full service bar, underwater photo shop, film processing lab, mini movie theatre, dive boutique, dining hall and of course, a fabulous ocean view.

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1966 TWENTY YEARS OF SERVICE TO DIVERS 1986

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caymans

It is a simple card that takes a few minutes to fill out and sign. Upon entering the Cayman air terminal, you will first pass through immigration processing and then have your baggage checked by customs.

Cayman immigration law requires three things of visitors: proof of citizenship, a completed entry form and a return air ticket. Although a passport is not necessary for U.S. or Canadian citizens, it is the easiest form of identification. For those without a passport, a voter's registration card is an acceptable alternative, but an automobile driver's license is not. Passports, but not visas, are required for British and Commonwealth subjects other than Canadians.

After clearing immigration, you will be required to pick out your luggage and present it for inspection by a Cayman customs officer. The inspector may want to go through your suitcase, dive gear bag and whatever carry-on luggage you may have. Do not attempt to smuggle in any type of illegal contraband such as handguns, ammunition or explosives.

A special warning to those to whom it may apply: Do not attempt to bring in any sort of illegal drugs, including marijuana. The Cayman Islands have the most severe anti-drug laws in the Caribbean. Violators are immediately arrested and taken off to jail. Visiting tourists are not immune to this enforcement. Violators can receive jail terms of up to ten years and fines of up to $20,000.



A descending diver is greeted by the flash of silvery tarpon at Tarpon Alley on Grand Cayman's North Wall. A school of more than 100 of these exciting fish resides here.

TAXIS/CAR RENTALS

After you have cleared customs and immigration at the airport, you will want to get to your hotel as quickly as possible and settle in for your vacation. As you exit the air terminal building, you will see a line of taxis comprised of every type of vehicle imaginable, including large sedans, station wagons and vans. It is a welcome sight to visiting divers who are usually lugging bulky gear and camera equipment bags.



Cayman Airways 727 jet



Northwest Airlines DC-9 jet

Once inside the cab and motoring toward your hotel, you may notice there is no meter ticking with the amount of your fare. Have no fear, you will not be charged any price that comes into the driver's mind. Cayman taxi drivers are very honest, as well as friendly. All of the cabbies belong to the Taxi Association, which has established rates from the airport to all the various hotels on the island. These are published once a year in a Rate Sheet and Fact Folder, distributed by the Department of Tourism and free upon request. A typical fare from the airport to the Royal Palms is $7.50 (U.S.); to the Holiday Inn it is $8.75 (U.S.). There is no charge for extra luggage or people. The taxi ride to most hotels along Seven Mile Beach takes 15 to 25 minutes.

After settling in at your hotel, you may want to consider renting a car to explore the rest of the island. There are many rental agencies on Grand Cayman and most will deliver the car to your hotel. Rental cars cannot be picked up at the airport terminal, but can be left there when you depart.

To rent a vehicle in the Cayman Islands you must present a valid driver's license from your home country. The rental agency will then issue you a temporary Visitor's Driving Permit. There is a small fee of $3 (U.S.) for this and you will be asked if you would like to purchase accident insurance with the car rental. Remember—in the Caymans, drive on the *left* side of the road!

Just about any type of vehicle you re-

quire is available, ranging from jeeps to full sized vans. If you have a particular need in mind, such as air-conditioning or a station wagon, then it would be wise to telephone ahead to reserve the car of your choice. Also, keep in mind that each rental agency may have a different inventory of car models.

LOCAL CURRENCY

The official currency of the Cayman Islands is the C.I. dollar, however the U.S. dollar is in wide circulation. Both are happily accepted by hotels, stores, dive operators and restaurants. In most cases if you pay for something in U.S. dollars, you are likely to receive your change in C.I. dollars.

Most of the business establishments in Cayman will quote you their prices for goods and services in C.I. dollars. C.I. stands for Cayman Islands and as with the U.S. system, one Cayman dollar is equal to 100 Cayman cents.

The Cayman Islands paper notes display a portrait of the Queen on the front and different local scenes on the back. The notes are issued in the following denominations: $1 (blue); $5 (green); $10 (red); $25 (brown & orange); $40 (purple); and $100 (orange). Coins are in 1, 5, 10 and 25 cent denominations.

U.S. and Cayman dollars are not equal in value. According to an agreement of the International Monetary Fund, the exchange rate is fixed at C.I. $1.00 = U.S. $1.20. However, restaurants and shops will convert at U.S. $1.25 in order to cover bank charges. If you expect to spend a large sum of money during your visit, it may be worth your time to stop in at one of the downtown banks to exchange your dollars at a more favorable rate.

It's also worth mentioning that while most Cayman hotels accept credit cards,

CAYMAN DIVE SERVICES

GRAND CAYMAN

Atlantis Submarine Tours
P.O. Box 1043
Grand Cayman, BWI
(809) 949-7700

Bob Soto's Diving Ltd.
P.O. Box 1801
Grand Cayman, BWI
(809) 949-2022

Cayman Aggressor (Live-Aboard)
P.O. Box 99
Grand Cayman, BWI
(809) 949-5551

Cayman Diving Lodge
P.O. Box 1801
Grand Cayman, BWI
(809) 947-7555

Cayman Kai Resort
P.O. Box 1112
Grand Cayman, BWI
(809) 947-9556

Clint Ebanks' Scuba Cayman
P.O. Box 746
Grand Cayman, BWI
(809) 949-3873

Divers World (shop)
P.O. Box 917
Grand Cayman, BWI
(809) 949-8128

Don Foster's Dive Grand Cayman
P.O. Box 151
Grand Cayman, BWI
(809) 949-5679

Eden Rock Diving Centre
P.O. Box 1907
Grand Cayman, BWI
(809) 949-7243

Fisheye Photographic Services
P.O. Box 2123
Grand Cayman, BWI
(809) 947-4209

Nick's Aqua Sports
P.O. Box 1698
Grand Cayman, BWI
(809) 949-1234

Peter Miiburn's
Dive Cayman Ltd.
P.O. Box 596
Grand Cayman, BWI
(809) 947-4341

Ports of Call (Live-Aboard)
P.O. Box 472
Grand Cayman, BWI
(809) 949-7468

Quabbin Dives (Cayman)
P.O. Box 157
Grand Cayman, BWI
(809) 949-5597

Research Submersibles Ltd.
P.O. Box 1719
Grand Cayman, BWI
(809) 949-3870

Rivers Sport Divers Ltd.
P.O. Box 442
Grand Cayman, BWI
(809) 949-1181

Scuba Safari Ltd. (Cayman)
P.O. Box 2029
Grand Cayman, BWI
(809) 949-3742

Seasports Ltd.
P.O. Box 1516
Grand Cayman, BWI
(809) 949-3965

Spanish Cove
P.O. Box 1014
Grand Cayman, BWI
(809) 949-3765

Sunset Divers
Sunset House Resort
P.O. Box 479
Grand Cayman, BWI
(809) 949-7111

Surfside Watersports
P.O. Box 891
Grand Cayman, BWI
(809) 947-4224

The Tortuga Club
P.O. Box 496
Grand Cayman, BWI
(809) 947-7551

Treasure Island Divers
P.O. Box 1817
Grand Cayman, BWI
(809) 949-7777

Undersea Photo Supply
P.O. Box 1551 G
Grand Cayman, BWI
(809) 947-4686

CAYMAN BRAC

Brac Aquatics, Ltd.
P.O. Box 89
Cayman Brac
Cayman Islands, BWI
(809) 948-7429

Dive Tiara
Tiara Beach Hotel
P.O. Box 238/Stake Bay
Cayman Brac
Cayman Islands, BWI
(809) 948-7313

Little Cayman Diver (Live-Aboard)
P.O. Box 89
Cayman Brac
Cayman Islands, BWI
(809) 948-7429

LITTLE CAYMAN

Pirate's Point Resort
Little Cayman
Cayman Islands, BWI
(809) 948-4210

Sam McCoy's Diving Lodge
14 Rochambeau Ave.
Ridgefield, CT 06877
(203) 438-5663

Southern Cross Club
South Hole Sound
Little Cayman
Cayman Islands, BWI
(809) 948-3255



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Paul Tzimoulis in Skin Diver says, "Don Foster's name is to diving what Harvard's name is to universities."

When you re not diving, soak up the sun on Grand Cayman's famous Seven-Mile Beach. You can even choose from the type of accommodations that you desire. The **Royal Palms of Cayman**, headquarters for Don Foster's, is a full-service oceanfront hotel complete with a freshwater pool, dining room, waterfront lounge and shops. If you desire privacy, choose from one or two bedroom luxury villas available through **Hospitality World Limited**, the Cayman's largest condominium management company.

From the finest in diving to the best accommodations, Don Foster's can make your paradise vacation a reality. For further information, contact: **Scuba Tours, Inc., 1-800-526-1394**, or (201) 256-9115.

DON FOSTER'S Dive
Grand Cayman Ltd.

P.O. Box 151
Grand Cayman, Cayman Island
B.W.I.

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there are many bars, restaurants, shops, etc. that do not. It would be wise to bring a small amount of cash and the rest of your money in traveler's checks to avoid the embarrassment of having a credit card refused.

While it is true that most responses to your question of "How much is my bill?" are answered in C.I. dollars, most restaurants and stores will give on-the-spot translations of what that means to you in U.S. dollars.

To give you a reference point to work from in converting your money from U.S. to C.I. dollars and vice versa, we have prepared a currency exchange rate chart. Please note the conversions were based on U.S. $1.25 = C.I. $1.00.

TELEPHONE SERVICE

The Cayman Islands have a modern automatic telephone system that enables visitors to call anywhere among the three islands or put through an international call to most anywhere in the world. There is direct dialing into Cayman from the U.S., Canada, U.K. and Europe.

When making a local call in the Cayman Islands, a five digit number is used (such as 9-1234). From the U.S. you can direct dial any number in the Caymans without going through an operator. The procedure is simple. You first dial 809 (area code for Caribbean), then dial 94 (the routing code) and the local five digit number. For example, to call Sunset House directly from the U.S., you would dial 1 (809) 949-5966.

ELECTRIC POWER

The Cayman Islands power system is completely compatible with the U.S. standard of electricity, 110 volt AC at 60 cycles. Electrical converters and outlet adapters are not required. Charging nickel cadmium battery packs, strobes and movie lights can be easily accomplished right in your hotel room. In addition, visitors may use their favorite electric shavers, hair dryers and radios.

CLIMATE

The Cayman Islands offer some of the finest weather in the Western Hemisphere. Because they are sufficiently distant from the North American continent, these islands are not subjected to the normal turbulence of winter storm fronts. The surrounding Caribbean Sea is a stabilizing force that maintains an even and constant balmy climate. Winter temperatures range from 70-80°F. Summer temperatures run from 80-90°F. It never seems to get too hot or cold.

CLOTHING

Packing for a trip to the Cayman Islands is relatively simple. Lightweight clothing is ideal. During the day, most visitors dress in casual shorts, sandals and either short sleeved shirts or T-shirts. In the evening, lightweight slacks and a sport shirt are fine for men. Women wear lightweight slacks or summer dresses. A sport jacket is recommended for dining at some of the more formal restaurants on Grand Cayman. Be sure to bring a hat or sun visor, suntan lotion, comfortable shoes for walking and sunglasses.

GRAND CAYMAN DINING GUIDE

Restaurant	Phone	Type of Food	Location	Hours	Days Closed	Credit Cards
Almond Tree*	9-2893	Local	N. Church St.	6:30 pm - 10:00 pm	None	AE, MC, V**
Borden's Pizza Hut	9-3462	Pizza	Morgan's Harb.	5:00 pm - 12:00 am	Monday	None
Burger King	9-6377	Take Out	N. Church St.	4:00 pm - 12:00 am	None	None
Caribbean Club*	7-4099	Seafood	West Bay Rd.	7:00 pm - 9:30 pm	None	AE, MC, V
Cayman Arms	9-2661	Continental	George Town	6:00 pm - 10:00 pm	None	None
Cayman Diving Lodge	7-7555	Local	East End	7:00 pm - 9:00 pm	None	AE, MC, V
Chez Jacques*	7-4444	Continental	Holiday Inn	6:30 pm - 10:00 pm	Mon./Thur.	AE, D, MC, V
Cracked Conch	9-5717	Seafood	Selkirk Plaza	6:00 pm - 10:00 pm	Sunday	MC, V
Crow's Nest	9-6216	Seafood	S. Church St.	6:00 pm - 10:00 pm	None	MC, V
DJ's Cafe	7-4234	American	Coconut Place	6:30 pm - 10:00 pm	None	AE, MC, V
Dominique's	9-5747	Pizza	George Town	5:30 pm - 10:00 pm	None	AE
Edoardos Trattoria	7-4408	Italian	Coconut Place	6:00 pm - 10:00 pm	None	AE, D, MC, V
Golden Pagoda*	9-5475	Chinese	West Bay Rd.	6:00 pm - 10:00 pm	None	AE, D, MC, V
Grand Old House*	9-2020	West Indian	S. Church St.	6:00 pm - 10:30 pm	None	AE
Guido's Pizzeria	7-4600	Italian	West Bay Rd.	5:00 pm - 10:00 pm	None	None
Hyatt Regency	9-1234	Continental	West Bay Rd.	6:00 pm - 11:00 pm	None	AE, MC, V
Island House Resort	9-3017	Local	West Bay Rd.	6:00 pm - 10:00 pm	None	MC, V
Jamin Smoke House	9-6003	West Indian	George Town	6:00 pm - 11:00 pm	None	None
Kentucky Chicken	9-2834	Take Out	George Town	6:00 pm - 11:00 pm	None	None
Le Diplomat*	7-4655	Continental	Grand Pavilion	6:00 pm - 9:30 pm	None	AE, MC, V
L'escargot*	9-7255	French	West Bay Rd.	6:00 pm - 10:30 pm	Sunday	AE, MC, V
Liberty's	9-3226	Local	West Bay Rd.	6:00 pm - 10:00 pm	None	None
Lobster Pot*	9-2736	Local	George Town	6:30 pm - 9:30 pm	Sunday	MC, V
Lone Star Grill	9-5575	American	West Bay Rd.	6:00 pm - 11:30 pm	None	AE, MC, V
Lord Nelson's Pub	7-4595	British	West Bay Rd.	5:00 pm - 1:00 am	None	None
Periwinkle Restaurant	9-2927	Seafood	West Bay Rd.	6:00 pm - 10:00 pm	None	MC, V
Ports of Call*	9-2231	Local	West Bay Rd.	6:00 pm - 10:00 pm	None	AE, MC, V
Primavera Restaurant*	9-7574	Italian	West Bay Rd.	6:00 pm - 11:00 pm	None	AE, MC, V
Ristorante Pappagallo*	9-1119	Italian	West Bay	6:30 pm - 11:30 pm	Monday	AE, MC, V
Royal Palms	9-2636	Local	West Bay Rd.	6:30 pm - 9:00 pm	None	AE, MC, V
Santiago's	7-4621	Mexican	West Bay Rd.	6:00 pm - 10:00 pm	Sunday	AE, MC, V
Spanish Cove	9-3765	Continental	West Bay	6:30 pm - 9:00 pm	None	AE, MC, V
Sunset House	9-5966	Local	S. Church St.	7:30 pm - 8:30 pm	None	AE, D, MC, V
Veranda Room	7-4444	American	Holiday Inn	5:00 pm - 10:00 pm	None	AE, D, MC, V
Villa Caribe Hotel	7-9636	Continental	North Side	6:00 pm - 10:00 pm	None	MC, V
Welly's Cool Spot*	9-2541	Local	George Town	6:00 pm - 10:00 pm	None	None

*Reservations recommended
**AE=American Express, MC=MasterCard, V=Visa, D=Diners Club

800 FT WALL DIVE



PHOTOS BY GERI MURPHY

...an incredible experience

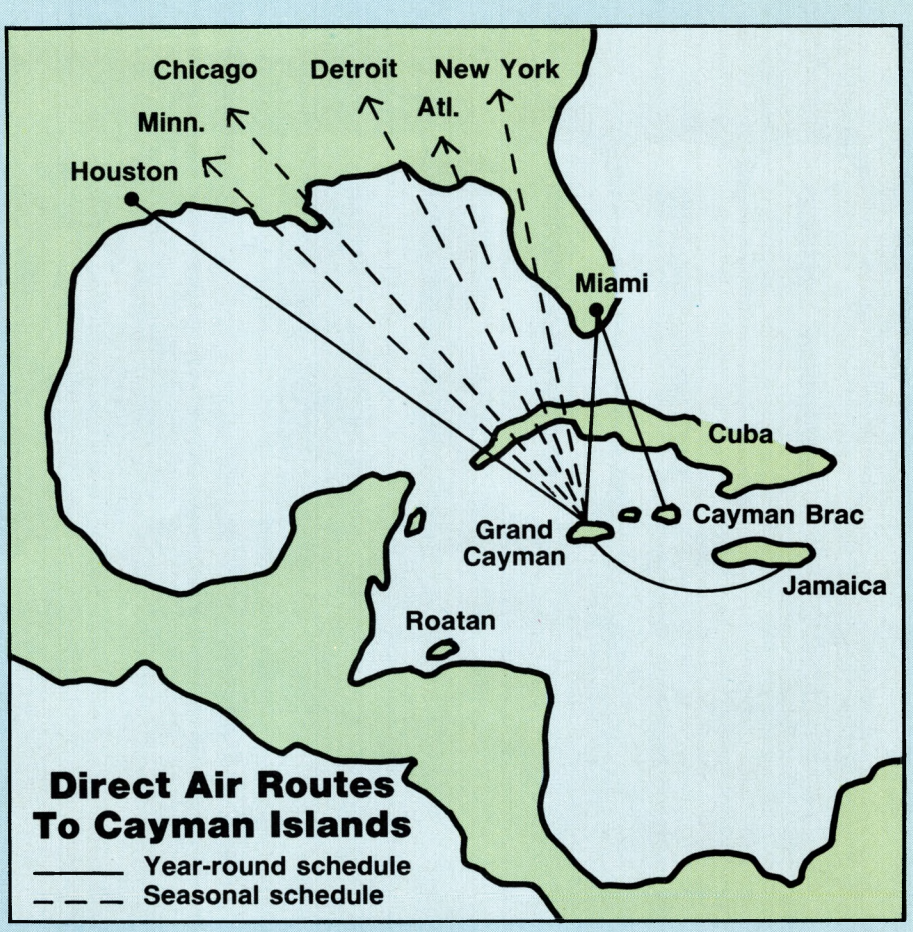


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- Our submarines are dry and at one atmosphere throughout your dive—so no previous diving experience is necessary.
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- Each trip is personalized with only two passengers and a pilot—book now to avoid disappointment.

For More Information And Bookings, Contact:

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P.O. Box 1719, Grand Cayman, BWI
TEL (809) 949-3870, 949-8296
TELEX 4519 RSL-SUB CP

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WATER TEMPERATURE

The water temperature in the Cayman Islands is even more constant than the air temperature. Winter waters range from 80-84°F; summer waters from 84-86°F. Casual divers frequently wear little more than a T-shirt and swim trunks. However, more experienced divers usually wear one-eighth inch full wetsuits because of longer or more frequent submersions. Wetsuits also protect divers from fire coral, hydroids, jellyfish and fire sponges.

BRITISH HERITAGE

The Cayman Islands have chosen to remain a British Crown Colony. Their government is a democracy of elected representatives and appointed officials. The governor is appointed by Her Majesty the Queen of England.

There are no income, property, capital gains or estate taxes in the Cayman Islands. Government revenues are mostly derived from import duties, business licenses and work permit fees. There is a six percent tax on hotel rooms.

International banking thrives in the Cayman Islands and there are strict secrecy laws that permit depositors to remain incognito. In addition, thousands of companies incorporate on Cayman because there is no corporate tax. The Caymans have become known as the "Switzerland of the Caribbean."

GRAND CAYMAN

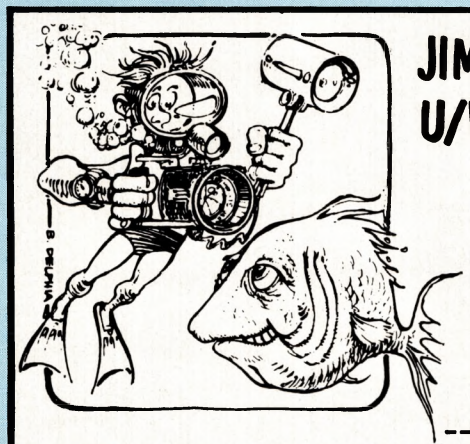
Among the three islands, Grand Cayman is the giant. It is the heart and soul of this British colony.

From a diver's point of view, Grand Cayman is possibly the most exciting, progressive and rapidly evolving island in the dive resort business. The selection of services, facilities and experiences is almost staggering. For an island 22 miles long and 4 miles wide, Grand Cayman is really cooking. At last count, there were 27 different dive services available on this island, including two futuristic submarine rides.

Before going into the diving services, let's review the basics. Grand Cayman supports a resident population of approximately 20,000 people, approximately 90 percent of the islands' population. It is the seat of government.

The two major industries on Grand Cayman are tourism and banking. And, the island excels in both fields. There are more than 450 banks. The tourism industry is an interesting blend of full service hotels, luxurious condominiums and inexpensive dive lodges. These accommodations are all in pretty much the same beachfront area. Frequently, they are next door to each other—sharing the same marvelous ocean view, splendid beaches and access to incredibly good coral reefs. Grand Cayman has something to offer everyone.

In addition to all its topside advantages and attractions, Grand Cayman sits on the doorstep of some of the best diving in the Caribbean. It is an island blessed with calm waters and fantastic vertical drop-



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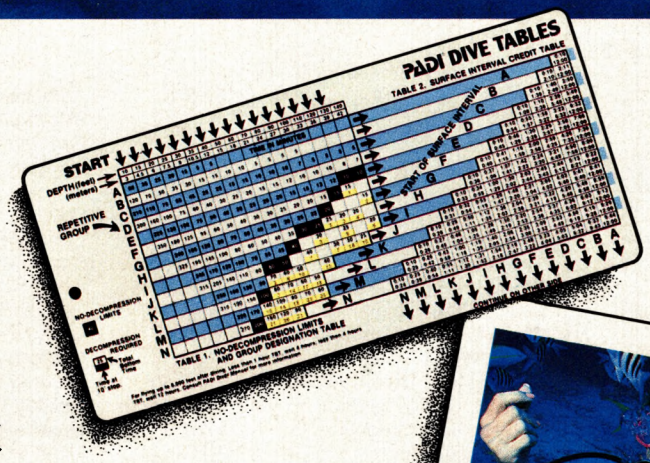
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Address _____
City _____
State _____ Zip _____



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offs less than one mile from shore. Underwater visibility of 100 to 150 feet is common and Cayman seas are often described as offering bathtub diving. The combination of shallow coral reefs, vertical walls, coral caves and wrecks provide visitors with a banquet of diverse diving experiences.

FASTEST GROWTH

Over the past five years, Grand Cayman has gained a worldwide reputation for superior diving, steady growth and continual improvement. However, the last 12 months have seen phenomenal changes. Eighteen months ago, the island opened a new, ultra-modern $15 million airport terminal. Marked by innovative island architecture, this new passenger terminal can accommodate up to five commercial jet airliners simultaneously. Two brand new luxury hotels have just opened and five other existing hotels have just finished major renovations and expansion of guest facilities. New restaurants are opening at the rate of one per month, broadening the selection of cuisine and dining ambience.

The same sort of facility improvements and expansion have been going on among Grand Cayman's diving resort operators. New dive boats have been added by a number of the major operators. Several have expanded their services by establishing new satellite facilities at choice hotels and condominiums. Liveaboard services have grown to include four boats, cruising among and around Grand Cayman, Cayman Brac and Little Cayman. Perhaps the most exciting news is the advent of two revolutionary submarine rides. No other island in the Caribbean offers such a unique opportunity. These futuristic submersibles permit divers and tourists to visit the coral reefs while remaining completely dry. One company operates a large sub that can carry 28 passengers and makes regularly scheduled dives to 100 feet during the day. Night dives are also scheduled. The other company operates two small submersibles that can take two passengers each to a depth of 800 feet!

The latest diving rage on Grand Cayman is U/W video. At least six different dive resort operators have installed complete U/W camera systems and are shooting videos of their guests. Visitors can now make a dive and go home with a complete videotape of their experience.

GEOGRAPHY

Because of the wide variance in geographic locations and environmental conditions, we have divided Grand Cayman into four distinct areas: George Town, Seven Mile Beach/West Bay, North Wall and East End. Each area offers its own individual advantages.

George Town is the hub of shopping, business and municipal services. It also has good access for diving. This area has a shoreline composed of ironshore rather than sand. However, there are many fine shore dives in the region as well as diving lodge accommodations.

Seven Mile Beach/West Bay is the Riviera of the Cayman Islands. It is most definitely hotel and condo row, thus serving as the heart of the action for visiting tourists. This is where you find most of the largest hotels, best restaurants and a wide variety of watersports.

North Wall is sort of the outer suburbs. This area is more remote, slower paced and more natural. It also provides access to some of Grand Cayman's finest diving. It has become legendary among divers.

East End is like stepping into a different world. It is at the opposite end of the island, 22 miles from George Town. The atmosphere and environment are much like Grand Cayman was 50 years ago. There are only a couple of small hotels in the region, but the East End offers some of the most exciting diving.

CAYMAN LOCAL PHONE NUMBERS

DIVE SERVICES

GRAND CAYMAN

Atlantis Tours Ltd.	9-7700
Bob Soto's Diving Ltd.	
Cayman Islander	9-7695
Grand Pavilion	7-4666
Headquarters	9-2022
Holiday Inn	7-4631
Scuba Centre	9-6469
Cayman Aggressor	9-5551
Cayman Diving Lodge	7-7555
Cayman Kai Resort	7-9556
Clint Ebanks' Scuba Cayman	9-3873
Divers World	9-8128
Don Foster's Dive Cayman	9-5679
Eden Rock Diving Ctr.	9-7243
Fisheye Photographic	7-4209
Nick's Aqua Sports	9-1234
Peter Milburn's Dive	7-4341
M/S *Ports of Call*	9-7468
Quabbin Dives Ltd.	9-5597
Research Submersibles Ltd.	9-3870
Rivers Sport Divers	9-1181
Scuba Safari (Cayman)	9-3742
Seasports Ltd.	9-3965
Spanish Cove	9-3765
Sunset Divers	9-7111
Surfside Watersports	7-4224
Surfside Rum Point	7-9598
The Tortuga Club	7-7551
Treasure Island Divers	9-7777
Undersea Photo Supply	7-4686

CAYMAN BRAC

Brac Aquatics, Ltd.	8-7429
Dive Tiara	8-7313
Little Cayman Diver	8-7429

LITTLE CAYMAN

Pirate's Point Resort	8-4210
Southern Cross Club	8-3255
McCoy's Diving Lodge	8-8326

ISLAND TRANSPORTATION

Avis Cico	9-2468
Budget Rent-A-Car	9-5605
Coconut Car Rental	9-4037
Tropicana Island Tours	9-4599

AIRLINES

Air Jamaica	9-2300
Cayman Airways	9-2311
Executive Air Services	9-7766
Northwest Airlines	9-2955

HOTELS AND CONDOS

GRAND CAYMAN

Ambassador's Inn	9-7577
Beach Club Resort	9-2023
Cayman Diving Lodge	7-7555
Cayman Islander Hotel	9-5528
Cayman Rent-A-Villas	7-4144
Cayman Kai Resort	7-9555
Christopher Columbus	7-4354
Coral Caymanian	9-4054
Coral Reef	7-4100
Dolphin Point Condos	9-3830
Grand Pavilion Hotel	7-4666
Grapetree Condos	9-5640
Harbour Heights Condos	7-4295
Holiday Inn	7-4444
Hospitality World	9-6485
Hyatt Regency	9-1234
Island House	9-3017
Le Club Cayman Hotel	7-4000
Limetree Bay	7-4045
London House Condos	7-4060
Pan Cayman House	7-4002
Plantana Condominiums	7-4430
Plantation Village	9-4199
The Retreat	7-9535
Royal Palms Hotel	9-2636
Silver Sands Apts.	9-3343
Spanish Bay Villas	9-3272
Spanish Cove	9-3765
Sunset House	9-5966
Tamarind Bay	9-4593
Tarquynn Manor	7-4038
Tortuga Club	7-7551
Treasure Island Resort	9-7777
Turtle Beach Villas	9-6347
Turtle Cove Villas	9-6344
Victoria House	7-4233
Villas of the Galleon	7-4433
Villas Pappagallo	9-3568

CAYMAN BRAC

Brac Reef Beach Resort	8-7323
Buccaneer's Inn	8-7257
Tiara Beach Hotel	8-7313

LITTLE CAYMAN

Pirate's Point Resort	8-4210
Sam McCoy's Lodge	8-8326
Southern Cross Club	8-3255

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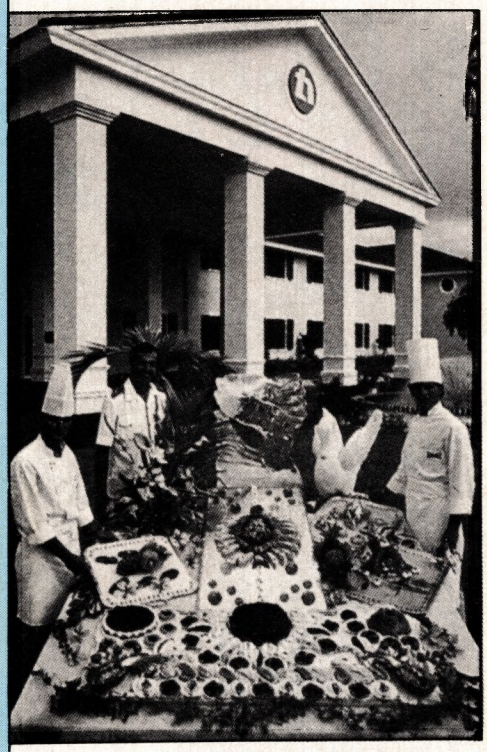
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WHERE TO STAY

Grand Cayman offers an incredible selection of accommodations. There are 21 hotels, more than 50 different condominiums and guest houses and three live-aboard dive boats. The variety is almost overwhelming, the selection sometimes difficult.

The best way to approach this task is to first figure out what type of accommodation is best for your particular vacation needs and in which area of the island you wish to stay. The basic categories are: beach hotels, off-beach hotels, waterside hotels, beach condos, off-beach condos or live-aboard dive boats. Practically all of these facilities are connected in some way with one of the 27 dive operations on Grand Cayman.

HOTELS

Beach hotels are generally the most popular choice, but also fall into a higher priced bracket. It is a case of supply and demand. The extra cost is certainly worth it if you desire a wide sweeping sand beach, glorious sunsets and a variety of watersports. Most of these are on Seven Mile Beach. They include: Holiday Inn, Royal Palms, Hyatt Regency, Coral Cay-

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Course #5	June 25-July 2
Course #6	July 9-18 (Critter)
Course #7	July 25-August 1
Course #8	August 6-15
Course #9	August 22-29
Course #10	September 5-12

The Jim and Cathy Church U/W Photo Classes will be offered from May 2 to September 12 at Sunset House on Grand Cayman. In addition to the usual seven night format, there are two courses that run for nine nights.

Rather than define a dive by the number of tanks available, the Churches anchor at a shallow spot for up to three hours. During that time divers can use as few or as many tanks of air as you like. There is no need to worry about running out of film, having a strobe break or having the wrong lens! Either Jim or Cathy is always on board the boat to change film, fix strobes or answer questions.



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Above left: The wreck of the *Ridgefield* at East End barrier reef, Grand Cayman. Left: Snorkeling among submerged wreckage around the *Ridgefield*. Below: A diver in colorful gear enjoys a snorkeling excursion off Seven Mile Beach, Grand Cayman.



manian, Treasure Island and Beach Club Resort. Not only are they right on the beach, but they are also centrally located to the island's best restaurants, nightclubs and shopping areas. Three of these hotels have dive shops on the premises and all five of them offer the convenience of having the dive boats pull right up on the beach to load guests.

The next category to consider is the waterside hotels, fronted by ironshore coral. This particular category is a favorite choice among serious divers. These hotels range in cost from economy to luxury. They include Sunset House and Spanish Cove. While neither of these properties has an extensive sand beach, each has a living coral reef directly in front. These inshore reefs range from 20 to 50 feet in depth and are loaded with macro creatures and pet fish. Each hotel has diving services on the premises.

There are two off-beach hotels worthy of consideration, the Cayman Islander and the Grand Pavilion. These are across the street from Seven Mile Beach. Both offer cable television (via satellite dish) in the individual rooms, plus beach access. This is where the similarities end. The Grand Pavilion is a 60 room executive class hotel that caters to business conventions, seminar groups and corporate officers. The Cayman Islander is a budget class motel that caters to groups, individual divers and business people.

There are four hotels that do not fit any of the above categories. They can be best described as outbound hotels since they are at the East End and North Side of the island. Ron Kipp's Cayman Diving Lodge and the Tortuga Club are at the East End and offer direct access to Grand Cayman's barrier reef. Cayman Kai and Villa Caribe are on the North Side, right at the doorstep of the world renowned North Wall.

CONDOS

Vacationing at a condo is an alternative choice to hotel accommodations and on Cayman it is a popular one. It is particularly desirable for large families or small groups. Condos are available in one, two, three or four bedroom apartments. Some of these are lavishly furnished and afford a luxury-style vacation. Since most of the condo units are owned by people who visit the island once or twice per year, these accommodations are offered on a rental basis by the day or week.

The difference between condos and hotels is that condos do not have the normal hotel services such as restaurants, cocktail lounges and watersports. Yet condos are a popular choice among repeat visitors. Once you know your way around the island, it is easy to rent a car, shop for groceries and get to the dive facilities, restaurants and nightclubs.

As with the hotels, Grand Cayman's condos can be separated into various categories. While space does not permit listing all of the condo properties, we can point out some popular with divers.

The beachfront condos include: Villas of the Galleon, Pan Cayman House, Tamarind Bay, Silver Sands, Sundowner, Coral Reef and Plantana. Waterside condos, fronted by coral ironshore, include: Spanish Bay Villas, Dolphin Point and others. Off-beach condos would include: Ambassador's Inn and Limetree Bay. Again, most of these facilities are connected with one of Grand Cayman's many dive operators. One more exception to the condo category is The Retreat, a new beachfront condo development at Rum Point on the North Wall. This facility has a new dive shop on the premises, operated by Surfside Watersports.

RESTAURANTS

If there is anything that could match the abundance of Grand Cayman's undersea reefs, it would be the island's impressive selection of restaurants. A quick look at the telephone directory will show listings for no less than 78 restaurants and fast food services—hard to believe for an island of only 20,000 residents!

Much of Grand Cayman's current restaurant boom is linked to the island's growing tourism. More than 200,000 visitors vacation on this island annually and even more drop in by cruise ship. We have listed 36 of the most popular dining spots as a result of personal visits and interviews with other divers. You are welcome to try any of the remaining 42 if you have the time!

Grand Cayman's collection of restaurants can be segregated into a number of categories. The more formal restaurants, offering gourmet style dining, include: Le Diplomat (at the Grand Pavilion), Chez Jacques (at the Holiday Inn), Caribbean Club, Grand Old House and L'Escargot.

The mid-range restaurants, which are a little more casual, include: the Lobster Pot, Almond Tree, Sunset House, Dominique's, DJ's Cafe, the Veranda Room (at Holiday Inn), Cayman Arms and Royal Palms Restaurant.

There are a growing number of speciality restaurants that include: the Golden Pagoda (Chinese), Crow's Nest (seafood), Guido's Pizzeria, Santiago's (Mexican), Periwinkle (Italian) and Edoardos Trattoria (Italian). The fast food restaurants include: Burger King, McDonald's and Kentucky Fried Chicken.

If you would like to finish off the evening meal with a special treat, we recommend a visit to the Häagen-Dazs Ice Cream Shop at Coconut Place. They offer a scrumptious selection of ice cream sundaes, banana splits and rich ice creams in more than a dozen flavors.

ENTERTAINMENT

While Grand Cayman may be no match for New York's Broadway, there is lively evening entertainment. This little island offers a surprising variety of evening spots for music, dancing and live stage entertainment. It is one of the reasons Grand Cayman has become so popular among young couples and those seeking a social atmosphere.

The best known nightclub on the island is the Wreck of the Ten Sails Lounge, directly off the lobby of the Holiday Inn. The

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club holds about 200 people and serves drinks only. There is a live band playing every night of the week except Sundays.

The main attraction at the Wreck of the Ten Sails Lounge is stage performer and singer, George Nowak, better known as The Barefoot Man. He is a prolific song writer who has produced 14 record albums over the past 15 years. More than two dozen of his songs concern divers. Tunes such as "Barracuda" and "That's a Moray" have made Barefoot the scuba diver's troubadour. What Don Ho is to Hawaii, Barefoot is to Cayman!

If you don't feel like dressing up for the nightclub set you might try visiting those restaurants that feature live music and individual entertainers. At the Almond Tree, owner Lenny Lloyd plays his guitar and sings pleasant folk-style music nightly.

SHOPPING

Grand Cayman's freeport shopping is quite unique. You will find many items here that are simply unobtainable in other parts of the Caribbean. For example, Grand Cayman artisans excel in the making of black coral jewelry. There are at least one dozen stores that offer a wide selection of handcrafted products. You can purchase anything from a simple coral pendant to a complete collection of silverware with carved black coral handles. Some of the more elaborate pieces of jewelry include black coral and rare gems in gold settings.

Other unique items include: Wedgewood china; handblown glass statues from Italy; beautifully cut crystal from all parts of Europe; and delicate porcelain statues. There is also a good selection of expensive perfumes, fine liquors, cameras, watches and electronic equipment.

SIGHTSEEING

If you are searching for something to do after the morning dives, Grand Cayman will not disappoint you. This island is loaded with things to see, places to go and things to do. It is an ideal choice for the vacationing family with diverse interests. Nondivers will not be bored.

One interesting place to visit is the Conch Shell House, a private home built of 4,000 conch shells. One of the most photographed historical sights is the Old Pink House, in the West Bay area. This simple but pretty dwelling is more than 100 years old and still occupied. It is an excellent example of the old style Caymanian homes, many of which still exist on the island.

If you want to see something really strange, try a visit to Hell, in West Bay. It is a unique limestone rock formation that appears almost volcanic in nature. The sharp, blackened spikes of eroded limestone are supposed to resemble the charred remains of a hell fire. Adjacent to this weird rock pit is a brand new government building known as the Hell Post Office. It's a great place to mail your postcards to friends and family back home: All mail sent from here is postmarked "Hell, Grand Cayman."

Not far from Hell is the Cayman Turtle Farm. It is right at the water's edge, just beyond West Bay. The farm has a fascinating self-guided tour that helps you become familiar with the history of turtles, their lifecycle and the farming operation itself. After viewing the exhibit, visitors are given a tour of the turtle ponds in which 10,000 live turtles are bred, fed and grown. The largest pond contains some giant, 300 pound creatures that are very old. Other holding tanks contain turtles of varying sizes and types, including several new crossbred species. There is also a gift shop on the premises that offers a variety of turtle mementos.

Exploring Grand Cayman's outer districts can be equally rewarding. If you have an interest in pirate history, I suggest a visit to the underground Pirates' Caves just outside Bodden Town. These are a labyrinth of small caves and narrow tunnels near the ironshore coast. The islanders claim early pirates hid their loot in them.

Further east is Pedro's Castle, a fortress-style structure reputed to have been occupied by the infamous pirate Blackbeard. It is on the south coast of the island and affords a panoramic view of the Caribbean Sea to the east, south and west. It was a perfect lookout point for 18th century pirates. At the East End of the island there is an ironshore formation known as the Blow Hole. Ocean waves roll into the seaward end of this chimney-like formation causing a geyser of water and spray to shoot upward almost 50 feet. It is an awesome sight, especially during heavy wave action.

How do you get around the island to see all these sights? One of the best ways is to take a ride on the Tropicana Tour Bus. You will see their bright yellow sightseeing vehicles driving around town every day. This Caymanian company features air-conditioned buses with large viewing windows and live narration by an experienced guide. They offer daily pick up services at all hotels and even some of the condominiums. Tropicana operates several different types of tours: a two hour, a four hour and an all day trip. Take your pick.

If you would like to try something special, you might consider a North Sound boat trip. This is much like a picnic at sea; it includes snorkeling and a seafood lunch. These trips generally depart at 9:00 am and return by 3:30 pm. One of the best known on Grand Cayman is operated by Capt. Crosby Ebanks and is known as Crosby's Watersports.

GRAND CAYMAN ISLAND

LOCATION	— 495 miles south of Miami, 1220 miles SE of Houston
LENGTH	— 22 miles
WIDTH	— four to eight miles
ELEVATION	— 60 feet/flat limestone island
CLIMATE	— Sub-tropical, balmy
TEMPERATURE	— Nov. to Apr. . . . 70/85°F May to Oct. . . . 80/90°F
ROADS	— Paved
POPULATION	— 20,000 residents
LANGUAGE	— English
GOVERNMENT	— British Crown Colony
CAPITAL	— George Town (2 traffic lights)
BANKS	— 450, International offshore banking center
TIME ZONE	— Eastern Standard Time
ACCOMMODATIONS	— 17 hotels 50 condos/apartments
SHOPPING	— Island crafts, crystal, porcelain, watches, perfume, jewelry, liquor
TRANSPORTATION	— Taxis, rental cars, bicycles, tour buses
COMMUNICATIONS	— Radio Cayman, daily broadcast; Cayman Compass, daily newspaper; Cayman Islands Sun, twice weekly newspaper; Cayman Pilot, weekly newspaper
ELECTRICITY	— 110 volts AC/60 cycles
DEPARTURE TAX	— CI $6, U.S. $7.50

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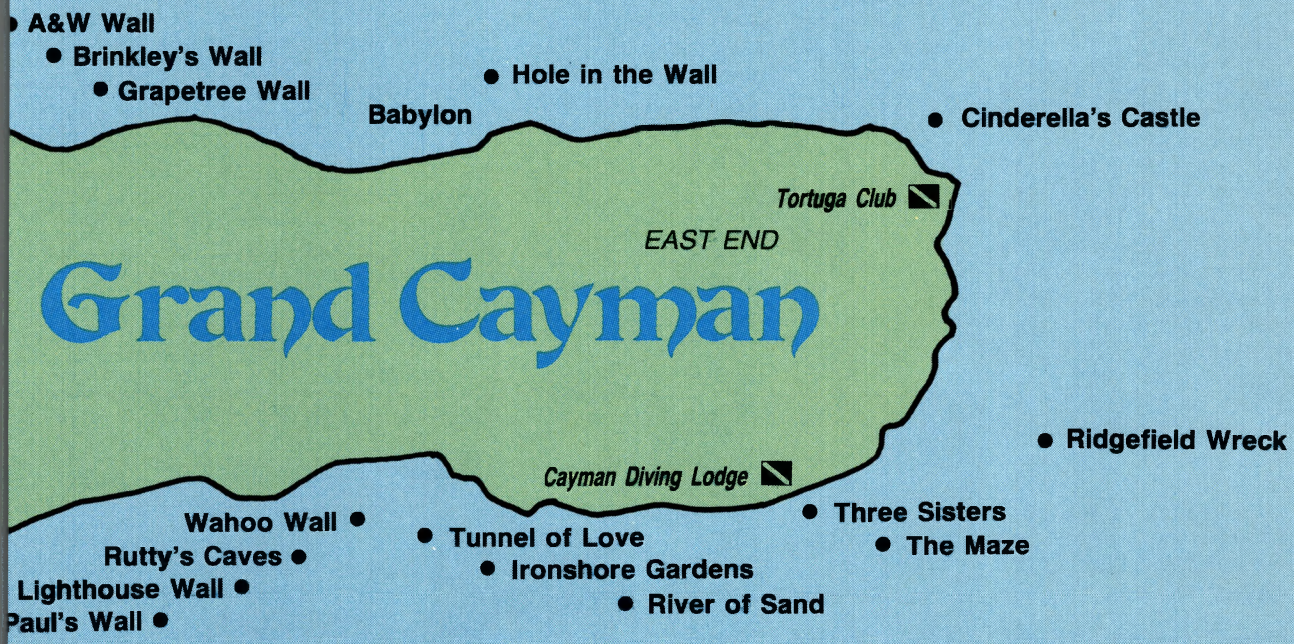
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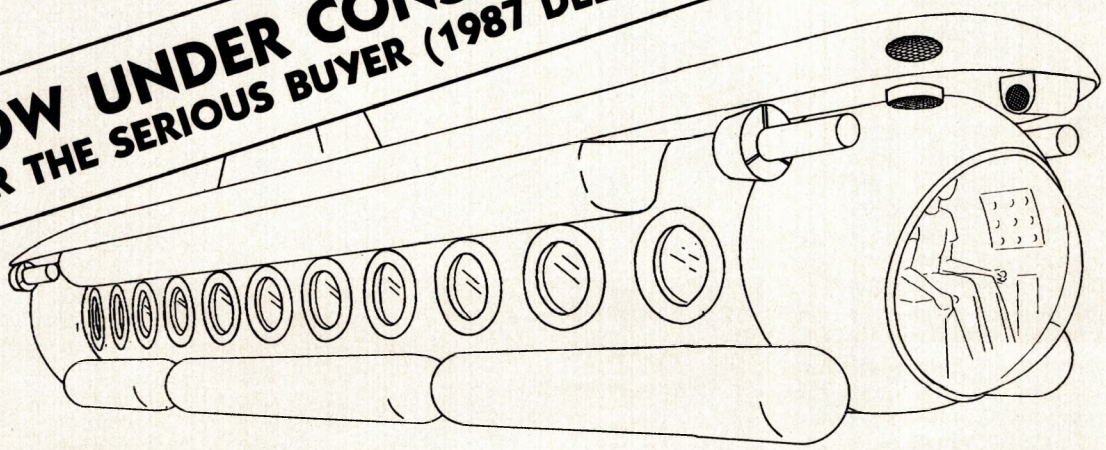
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SDM's Guide To Cayman Dive Sites



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SUBMARINE RIDES

A new form of sightseeing has been added to the Grand Cayman activity list—submarine rides! Unlike the amusement park simulators, these subs are the real thing. Designed for serious scientific and commercial work, these durable steel machines can actually seal hatches, make dives to a variety of depths and maneuver among the coral reefs with the aid of electric motors. For the first time ever, nondiving visitors can make eyeball-to-polyp observations of Grand Cayman's reefs while remaining perfectly dry at surface pressure.

Grand Cayman is the first island to offer such futuristic underwater sightseeing activities on a large scale. There are presently three submarines in service and possibly more to come. These have become big hits with both divers and nondivers alike. This trend may be the dawn of a whole new phase of underwater enjoyment.

The first company to hang out its submarine shingle was Research Submersibles Limited (RSL). This small company offers a real high voltage experience that is especially exciting for divers. Based at George Town Harbour (next to the Burger King), RSL operates two Perry deep submersibles, formerly used for oceanographic exploration. Each will carry up to two passengers, plus a pilot. These small submersibles are the size and equivalent of an underwater sports car, but don't go as fast. What they do best is go deep.

RSL offers deep submersible dives to 800 feet along the face of Grand Cayman's vertical drop-off. Divers finally have an opportunity to go over the wall and personally see what lies beyond the 130 foot limit for safe scuba. The sub follows the vertical face of the wall to a depth of 550 feet, where it changes abruptly to a 45 degree slope. The sub continues down to a maximum of 800 feet, where passengers can observe the bizarre sights of many benthic creatures and corals. One of their most exciting dives is a visit to the *Kirk Pride*, the intact wreck of an inter-island freighter. It is perched on the wall at 800 feet, held in place by a giant rock formation.

RSL schedules four dives daily for each submersible and is often booked in advance. Each dive lasts approximately one hour. Guests receive a personalized explanation of the sub's functions throughout the dive, plus a highly informative narrative on the marine life viewed through the sub's 36 inch dome port.

The newest addition to Grand Cayman's burgeoning submarine fleet is the giant 28 passenger *Atlantis*. Designed and built in Vancouver, Canada, this futuristic submersible is the first of its kind in the world. It has been described by the inventor as a touring sub, constructed specifically for underwater sightseeing.

The *Atlantis* is 50 feet long, weighs 50 tons and features 14 side viewing ports that are 24 inches in diameter. Passengers sit side-by-side, with two people sharing a port. The interior of the sub is roomy, with six and one-half feet of head room, complete air-conditioning and stereo music. The vessel cost $3 million and took two years to complete.

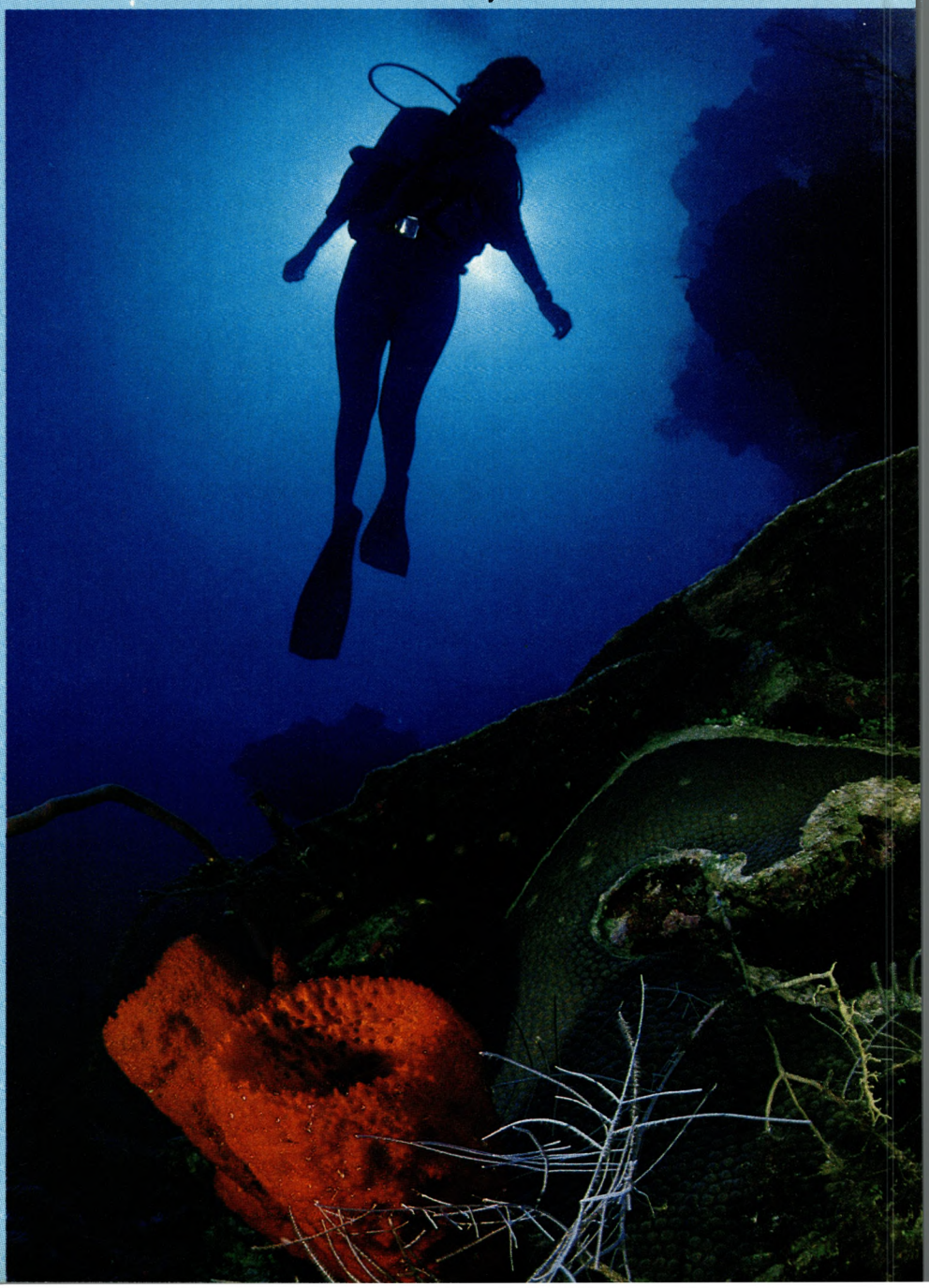
Also based at George Town Harbour, Atlantis Submarine Tours plans to operate 12 to 14 trips daily. They will schedule both day and night dives, providing Grand Cayman visitors with a new form of nighttime entertainment. The sub is certified down to 150 feet. Divers may find the *Atlantis* a great way to introduce nondiving friends and family to the marvels of the undersea world.

DIVE SERVICES

The dive operators of the Cayman Islands (including Little Cayman and the Brac) are regarded as some of the most progressive and safety conscious in the Caribbean. They have continuously reinvested their profits in better boats, upgraded equipment and improved services. Because of the large volume of divers who pass through Cayman, these operators have learned to be highly efficient, very courteous and extremely skilled in conducting dives.

The majority of Cayman's dive opera-

A diver is silhouetted while cruising over bright red cup sponges growing on Grand Cayman Island's fabulous North Wall.



tors have formed an organization known as the Cayman Islands Watersports Operators Association. It is dedicated to safety, education and conservation of the marine environment. It has done a marvelous job of upgrading safety standards and training divemasters. Each boat carries a full complement of emergency and safety equipment, including: oxygen supply, first-aid kit, tilt board, VHF radio, dive tables, float line, dive flag and at least one flotation device for each person on board. Boats involved in night diving carry marker lights for above water as well as underwater.

Cayman divemasters are required to have training and certification as divemasters, assistant instructors or instructors. They also receive training in first aid, rescue and CPR.

In addition to the great strides made in diving safety, the Watersports Association has spearheaded an effort for the development of marine parks. Members have volunteered their services and contributed money for the establishment of a series of moorings at popular dive sites, in an effort to prevent anchor damage to fragile coral.

DIVE SITES

Grand Cayman offers the greatest selection of catalogued dive sites. Hundreds of different ones have been discovered, charted and photographed during this island's 25 year history of sport diving development. Names such as Trinity Caves and Orange Canyon are legendary among traveling divers.

Many of the best sites are directly off Seven Mile Beach, 5 to 15 minutes from shore. It is no accident that Grand Cayman's hotels and condos are concentrated in this area, for Seven Mile Beach offers the calmest waters and some of the best visibility. It is not uncommon for the ocean surface to be flat like a mill pond and for underwater visibility to range 100 feet or more. In many spots, the wall is less than one-quarter mile offshore.

If you think all wall dives are pretty much the same, you are mistaken. On Cayman the drop-off provides an infinite number of profile variations. There are vertical walls, sloping walls, undercut walls, great coral canyons, massive pinnacles, long coral tunnels, vertical chimneys and huge caverns. Each dive site has its own personality and even the marine growth is different.

Most drop-offs are considered deep dives, with the upper edge of the wall beginning anywhere from 55 to 85 feet. There are even some that begin deeper but are limited to expert divers only.

In addition to the drop-offs, Grand Cayman offers an excellent variety of medium and shallow depth reef diving. These spots are closer to shore, with slightly less visibility, but often much more fish

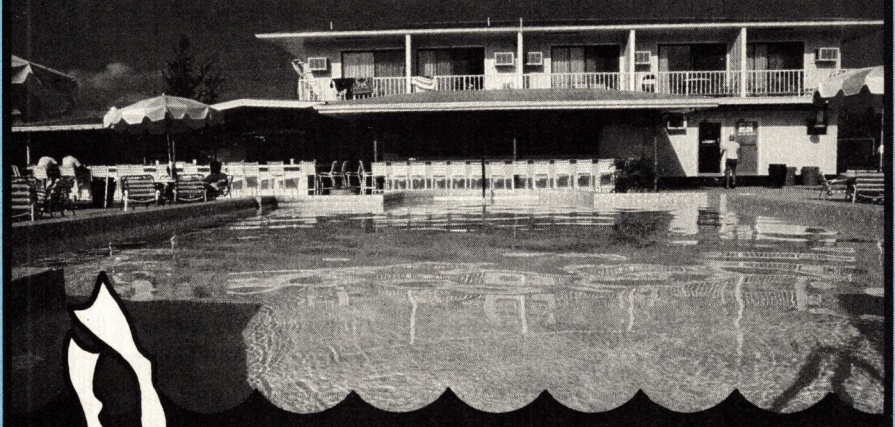
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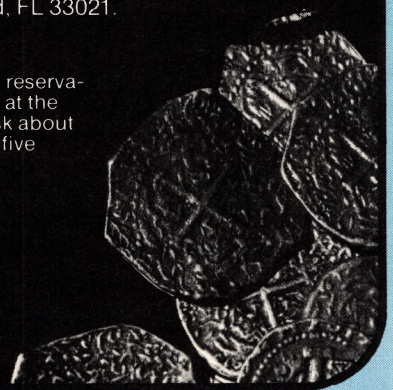
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Cayman Islander

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life. In fact, most of the fish feeding stations are on the shallow and medium depth reefs because this allows divers increased bottom time.

Grand Cayman also has several good shipwrecks that are really fun to dive. The sunken hulks lie in shallow to medium depths and are loaded with fish and macro creatures. They are excellent sites for underwater photography and many commercial movies have been shot here.

Another aspect of Grand Cayman is the shore diving available at about one dozen locations. This has grown in popularity and is encouraged by a number of the hotels and scuba operators.

The diving around Grand Cayman can be basically divided into four separate geographic areas. Each of these is adjacent to a certain group of hotels and dive operators that can provide convenient and quick accessibility.

Beginning with the George Town area and moving counterclockwise around the island, the four geographic diving areas are as follows: 1) George Town; 2) Seven Mile Beach/West Bay; 3) North Wall; and 4) East End. The following is a brief synopsis of the underwater attractions that can be found in each of these.

GEORGE TOWN AREA

Soto's Reef is on the north side of George Town Harbour, directly offshore the Lobster Pot and Bob Soto's Diving Headquarters. This is a very shallow dive, with coral heads less than six feet below the surface. It is a perfect dive for snorkelers. For scuba divers this reef offers many tunnels and coral chambers to explore. The caves often contain small schools of baitfish. A late afternoon dive has a cathedral-like atmosphere as the sunlight streams through small openings in the high vaulted coral chambers.

The remains of the 375 foot ***Balboa*** are scattered over several acres of George Town Harbour ocean bottom. Only 200 yards off the town pier, this site has played host to hundreds of thousands of divers. Sunk during a hurricane in 1932, this wreck has a good deal of marine life growing on it, which has attracted great numbers of fish. Depths are from 25 to 35 feet. The *Balboa* is a delight for beginning divers, wreck divers and photographers. Its twisted hull plates and bent steel beams provide a fascinating tour of the ship's separated but still recognizable parts and pieces. The propeller is one of the most prominent features; the *Balboa*'s stern is upside down and the prop points toward the surface. There is one large section of curved hull lying horizontal in a sandy area. The high curvature of this portion has formed an artificial cave. You can actually swim underneath the metal structure and surface within an air pocket trapped in the high portion of the hull.

Because this shipwreck has been submerged for more than 50 years, there is a good deal of marine life growing on it. You will find some corals, seafans, seaplumes and many sponges growing on the various parts of the jumbled structure. The *Balboa*'s convenient location, shallow depth and abundance of creatures make it an extremely popular night dive.

Eden Rock is on the south side of George Town Harbour, directly out from the Eden Rock Diving Center. This site is only 140 feet from shore and is easily accessible to the snorkeler or diver. Eden Rock is honeycombed with caves and tunnels ranging in depth from 15 to 35 feet. It is also an excellent night dive.

Devil's Grotto is just south of Eden Rock and separated from it by a sand gully. This reef is similar to Eden Rock but features a very long tunnel that opens into a large grotto with a cathedral shaped exit. At times this cave is inhabited by hundreds of baitfish that open and close like a curtain to allow divers to pass.

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Waldo's Reef is directly off South Cove. The depth here ranges from 30 to 50 feet and the area is loaded with coral formations, fans and sponges. This reef is best known for the resident six foot green moral eel, Waldo. Other tame fish include a giant jewfish, a very large barracuda and several of Waldo's relatives.

Just south of Sunset House is an interesting dive site named **Armchair**. In 60 to 70 feet of water, there is a giant barrel sponge contoured like a big overstuffed armchair, hence the name.

Eagle Ray Rock is a very beautiful wall dive on the corner of the southwest point on the western side. This location was named after the many elegant eagle rays frequently seen cruising along this section of the drop-off. The top of the wall begins at 55 feet and drops vertically. There is an interesting L-shaped ravine formed by a high coral promontory with vertical sides. The walls of this canyon are loaded with all types of colorful sponges, black coral trees and seafans.

Pinnacle Rock is an extremely unusual pillar coral formation that is 80 feet tall and 35 feet in diameter. It is cylindrical in shape and rises from the floor of the ravine. The top of the pinnacle is flat and slightly overgrown, giving it an almost mushroom-like appearance. This very tall pillar is perched on the very edge of the drop-off, right where the sand ravine spills over. The formation is covered with hard corals, soft gorgonians, seafans, colorful sponges and slender seawhips. Swimming around the pillar, one can observe clusters of large brown tube, crimson red vase and electric pink vase sponges, brilliant yellow gorgonian fans, orange cup sponges and other exotic forms of marine life. Adjacent to the pinnacle are two vertical walls that form the sides of the ravine. They are less than 50 feet away and help to form a shield from the current that flows along the south wall. The side walls are equally loaded with marine life but do not have the exotic variety found on the pinnacle.

Archway is a favorite shallow coral dive that consists of an interesting overhang in 45 feet of water. This spot is around the corner from George Town, on the south side of the island, directly off the wreck of the ***Palace***.

Palace Wall is an impressive vertical wall farther offshore from Archway. This drop-off begins at 80 feet and is well known for its gorgonian fans and pinnacle formations.

WEST BAY/ SEVEN MILE BEACH

The north end of Seven Mile Beach is very popular and almost all of the dive operators run daily trips to this area. One of the favorites is **Orange Canyon**, so named because of its brilliant array of colorful orange elephant ear sponges. The best diving here is at 75 to 90 feet. A giant coral head sits on the edge of the wall with two ravines forming canyons on either side and trailing all the way back at 60 feet. Along both these ravines are many different sized orange sponges, engulfed in gorgonians and seafans.

Sentinel Rock is a unique pinnacle, jutting out into blue water at the top of the wall at 90 feet. It is an extremely photogenic drop-off with lovely tube sponges and giant gorgonian fans.

Big Tunnel is an extremely impressive drop-off with a giant coral archway. The top is at 105 feet, the bottom at 120. It is a sheer wall approximately 300 feet in length and carved by many winding channels and canyons. There is a large coral promontory at the south end and the coral archway is at the north end. While there are many smaller tunnels, crevices and overhangs, the real thrill of this dive is the arch. You approach this formation from the landward side and encounter the very top of the arch at 105 feet. It is immense in size, measuring at least 30 to 40 feet in diameter, and exits on the very face of the drop-off.

The interior of the archway is beautifully adorned with all types of colorful sponge formations including elephant ear, tube, basket and vase. A row of



black gorgonian fans lines the outer rim of the archway and some of these are four feet tall. The sand floor of the arch forms a funnel that continues down to more than 200 feet.

Visibility at Big Tunnel frequently exceeds 125 feet. On a good day, you can actually see all the way through the archway while snorkeling on the surface. It is not unusual to encounter a school of horse-eye jacks cruising along the outside edge or perhaps swimming down through it.

Big Dipper is a drop-off just south of Big Tunnel. The top of the wall begins at 55 feet, where a large coral rampart juts out from the face of the wall and helps form a small coral valley. This drop-off takes its name from a gigantic basket sponge that is found at 105 feet. The sponge is in the coral valley and surrounded by black gorgonian fans and many hard coral formations. This unusual basket sponge is at least six and one-half feet tall. It is large enough to hold at least three or four scuba divers and makes an excellent subject for U/W photography.

Probably the most popular and best known wall dive off Grand Cayman is **Trinity Caves**. The name is somewhat of a misnomer as the caves are actually long narrow coral canyons that eventually turn into tunnels as they approach the edge of the drop-off. There are a total of four coral canyons in this area that provide a fascinating deep sea trail into the coral wilderness. There are two comparatively long tunnels that run almost parallel to each other. They begin in approximately 60 feet and slope gradually downward to 100 feet where they exit together on the face of the wall. Just south of the twin tunnels is a slightly shorter and more meandering tunnel, which also leads to the drop-off, but exits into a deep coral crevice directly in front of a towering pinnacle. Just to the right of this tunnel's exit is another much shorter tunnel that curves in U-shape fashion around a second coral pinnacle.

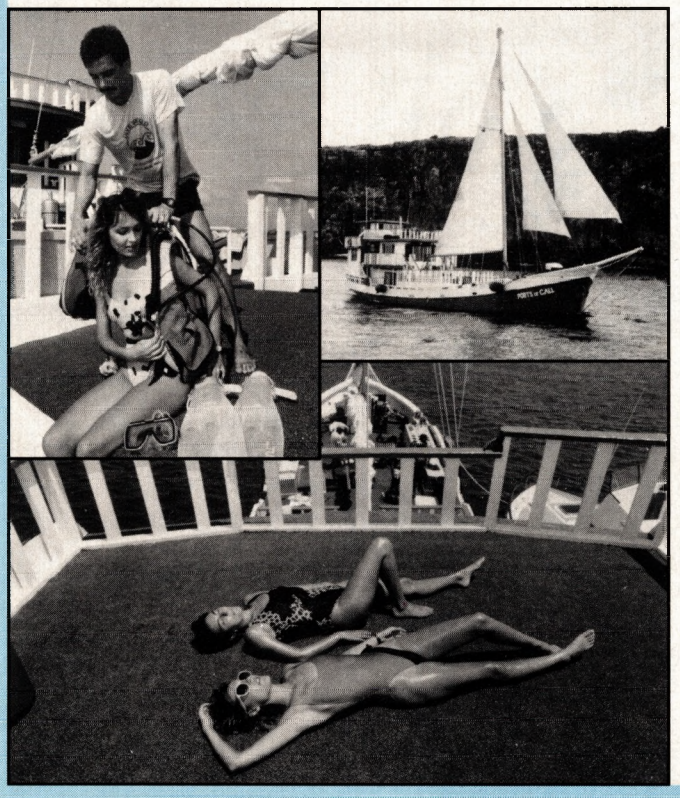
Trinity Caves is also popular because of the black coral that grows along the walls and floors of the passageways and on the outside face of the drop-off. In addition to the black coral trees, Trinity is studded with a marvelous array of big sponges in every imaginable shape. There are baskets, tubes, earlobes, vases, platters and at least a dozen more forms. As you ascend along the outside face of this drop-off you will see a number of giant basket sponges and barrel sponges. The upper portion of the wall is covered with bushy black gorgonian fans that stand three to four feet tall.

About one-half mile south of Trinity Caves is a dive site known as **Sand Chute**. It starts in 60 feet of water where you discover a 300 foot wide river of sand. It slopes on a gradual incline to a depth of 120 feet, where the sand flow has narrowed. At this point, the slope becomes steeper, slanting on a 45 degree angle, and continues to plunge to more than 350 feet. The white sand slope looks like a snow ski run with mountains of coral formations bordering the sides. These formations are at least 100 feet long and rise almost vertically to 60 feet.

The most unique feature of Sand Chute is the monstrous barrel sponge that grows from the south wall at about 100 feet. This mammoth growth is eight to nine feet tall and six feet in diameter. The mouth of the sponge is approximately four feet in diameter and the overall color is a pinkish-gray. This sponge is especially impressive because it grows straight out from the side of the coral wall and becomes the dominant feature of the entire area, almost dwarfing everything else around it.

Just above the giant barrel sponge is a slightly smaller basket sponge at 90 feet. It is about five feet tall and six feet in diameter but looks tiny compared to its big brother. The entire wall bordering the

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chute is loaded with all types of sponges, including many of the crimson red types sometimes called blood sponges. These can be found between 100 and 120 feet.

Spanish Anchor is a shallow site, used as a second morning dive. The reef lies in 50 feet of water and was named for an old anchor (believed to be Spanish) embedded in the coral. There are a lot of tame fish on this reef, including several species of angelfish. Adjacent to Spanish Anchor is **Aquarium**, another shallow dive, about 45 to 50 feet deep. Here, the fish are so tame you almost have to push them away from your facemask. They have been well cared for by visiting divers and eagerly await gifts of food. Handouts are gratefully accepted by queen and gray angels, hogfish, butterflyfish and sergeant majors.

The ***Oro Verde*** lies in 50 feet of water, about one-quarter mile off the beach of Le Club Cayman. Deliberately sunk in 1980 by the Cayman government and dive operators, this shipwreck is one of the most popular dives off Cayman. The 184 foot ship lies on her starboard side, completely intact, and has become a refuge for all types of marine life. Schools of yellowtail snapper and sergeant majors swarm around divers. French angelfish approach divers without fear.

Royal Palms Ledge lies off the Royal Palms Hotel in 35 to 55 feet of water. The top has tightly clustered coral heads providing protection for small fish. The underside of the ledge curves sharply back, going down to a sandy channel at 55 feet. The dive is best known for the abundance of tiny invertebrates that cling to the walls.

Hepp's Pipeline is off the northwest shore, directly out from the Turtle Farm. The reef has a strangely shaped undercut coral ledge 30 to 65 feet down. It runs parallel to the shore for hundreds of yards and contains many fascinating sponges, including bright green finger, buff brown elephant ear, cup and azure formations.

Hepp's Pipeline features an extremely unique basket sponge that has grown in the shape of a large peacock chair or high-backed throne. It has been very descriptively named **Neptune's Throne**. The sponge is tucked under a small coral ledge in 50 feet of water and faces the open sea. It is large enough for a scuba diver to be comfortably seated in it.

Spanish Cove Reef is about 100 yards from Spanish Cove and is often dived from shore by the guests staying at the resort. The top of the reef is at 25 feet and there is a small drop-off that goes down to 55. This is a small vertical wall sometimes called Little Drop-off. This site is popular because of the many small invertebrates that live here. It is considered one of the best macro dives on the island.

NORTH WALL

The drop-offs along the north shore of Grand Cayman from Conch Point to Rum Point are reputed to be the island's finest. Dive operators from the Seven Mile Beach area frequently make weekly all day dive trips around the northwest point, visiting the drop-offs along the western edge of North Sound.

Grouper Point is a beautiful drop-off at the eastern end of the North Wall. The top begins at 65 feet. There is a forked coral ravine in the shape of a narrow V with a tall, thin promontory jutting out into the deep blue ocean. The sides of this unusual formation are vertical and drop from 70 to 100 feet, where they meet a white sand bottom. A small tunnel at the base of this formation cuts completely through the point of the promontory and runs from one coral ravine to the other. Grouper Point is an exceptionally pretty wall with many black gorgonian fans, sponges and corals of all types.

Josh's Canyon is a lovely section of the North Wall approximately one mile west of the main channel. This is a popular wall dive and typical of the dozen or more drop-off sites to be found along the North Wall. There is a series of high coral

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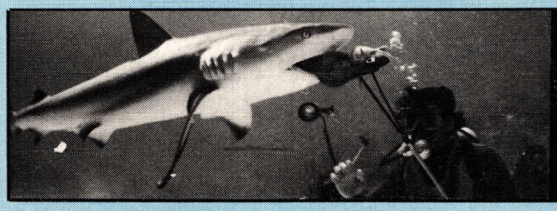


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cliffs and deep water coral ravines with sandy canyon floors. The tops of the cliffs are covered with staghorn coral. Divers will find a marvelous array of black corals, sponges of every shape and color and deepsea gorgonian fans along the vertical face.

Tarpon Alley is an exciting site where a school of more than 100 giant tarpon reside in a narrow coral canyon at the top of the wall. Divers can swim through the canyon, almost touching the tarpon as they weave back and forth.

Valley of the Rays is a large, flat sandy area adjacent to Tarpon Alley where dozens of giant stingrays rest on the sandy bottom. Divers who move carefully can usually get within a few feet of the rays without disturbing them.

Grand Canyon is a coral wall that almost defies description. The immense dimension of this formation literally dwarfs the diver and vividly portrays the grandeur of the North Wall drop-offs.

Two giant coral ramparts jut outward from the vertical wall with a gaping chasm of clear blue water in between. It is about 150 feet from one rampart to the other and the rim of the wall curves sharply inward, forming a U-shaped indentation. It is this configuration that gives rise to the name Grand Canyon.

The tops of the two coral buttresses are at 70 feet and their sides form vertical walls that plunge straight down into limitless depths. The walls of Grand Canyon are loaded with many gorgeous forms of marine life. There are some splendid trees of black coral and a very large basket sponge at the 100 foot level.

No Name Wall is straight out from Rum Point Channel, at the eastern end of North Sound. The top of the drop-off begins in 55 feet of water with a sharply sloping wall. The upper edge is uniquely marked by a series of four parallel coral ravines. They begin at 55 feet and slope to 90 feet where they go over the edge of the wall.

One of the main attractions of No Name is a large, crimson red sponge growing out from the face of the drop-off at a depth of 120 feet. This sponge is shaped like a basket, 18 inches in diameter and two feet tall. It grows out from the wall almost horizontally.

Neptune's Gallery is a lovely drop-off two miles east of Cayman Kai Resort. Its main feature is a deep narrow canyon that cuts through the top of the reef and exits onto the vertical face of the drop-off. The top begins at 60 feet where there is a long narrow crack measuring three feet in width. Descending into the crevice one encounters a deep but narrow coral canyon. The walls are 50 feet high and the floor of this passageway is paved with

pure white sand. The canyon winds around several corners and zig-zags its way toward the edge of the drop-off. The coral reef above has actually grown together, forming a narrow winding tunnel. The walls of the canyon are adorned with green and red finger sponges, small basket sponges, gorgonian fans and black coral trees. Near the end, the canyon splits into two separate passageways with a large coral formation in the center.

The canyon eventually opens onto the face of a vertical wall at 120 feet. The best part of the dive is swimming out of the canyon and into the inky blue water of the drop-off. The outer face of this wall is loaded with lovely corals, giant fans and sponges of all kinds. In some places there are deeply carved undercuts that reach back under the wall eight to ten feet. The marine life growing from these undercuts is an array of exotic colors.

Gale's Mountain is another extraordinary coral formation perched on the edge of the drop-off. In fact, it is the only formation of its kind known to exist off Grand Cayman and is worth seeing. A miniature submarine mountain peak, it is approximately 250 feet across at the base, rises to within 40 feet of the surface and is flattened at the top. This mammoth formation is flanked by two coral canyons that spill over the edge of the wall and help to give it an awe-inspiring appearance.

The mountain is covered with a diverse array of sponges, hard corals, soft gorgonians and other forms of marine life. There are many pink vase sponges and a few red cup sponges. This unusual mountain peak seems to attract an abnormal amount of fish activity. There are often great clouds of baitfish swarming around it and many schools of jacks cruise along the drop-off.

EAST END

There is a giant, crescent shaped barrier reef off the East End of Grand Cayman. Beyond the surf line lie some of the most exciting drop-offs to be found anywhere. It is a fabulously rich area with massive coral formations and a great deal of big fish action.

The East End drop-offs are not well known to most Cayman visitors because of their remote location—25 miles—from George Town. These reefs are not dived by the operators along Seven Mile Beach and visitors must therefore journey to the opposite end of the island to experience this unique adventure.

Ironshore Gardens is a spectacular forest of elkhorn coral in 50 feet of water a short distance from the Cayman Diving Lodge. There are numerous caves and tunnels for exploring. At times, tarpon are seen here, as well as adult parrotfish.

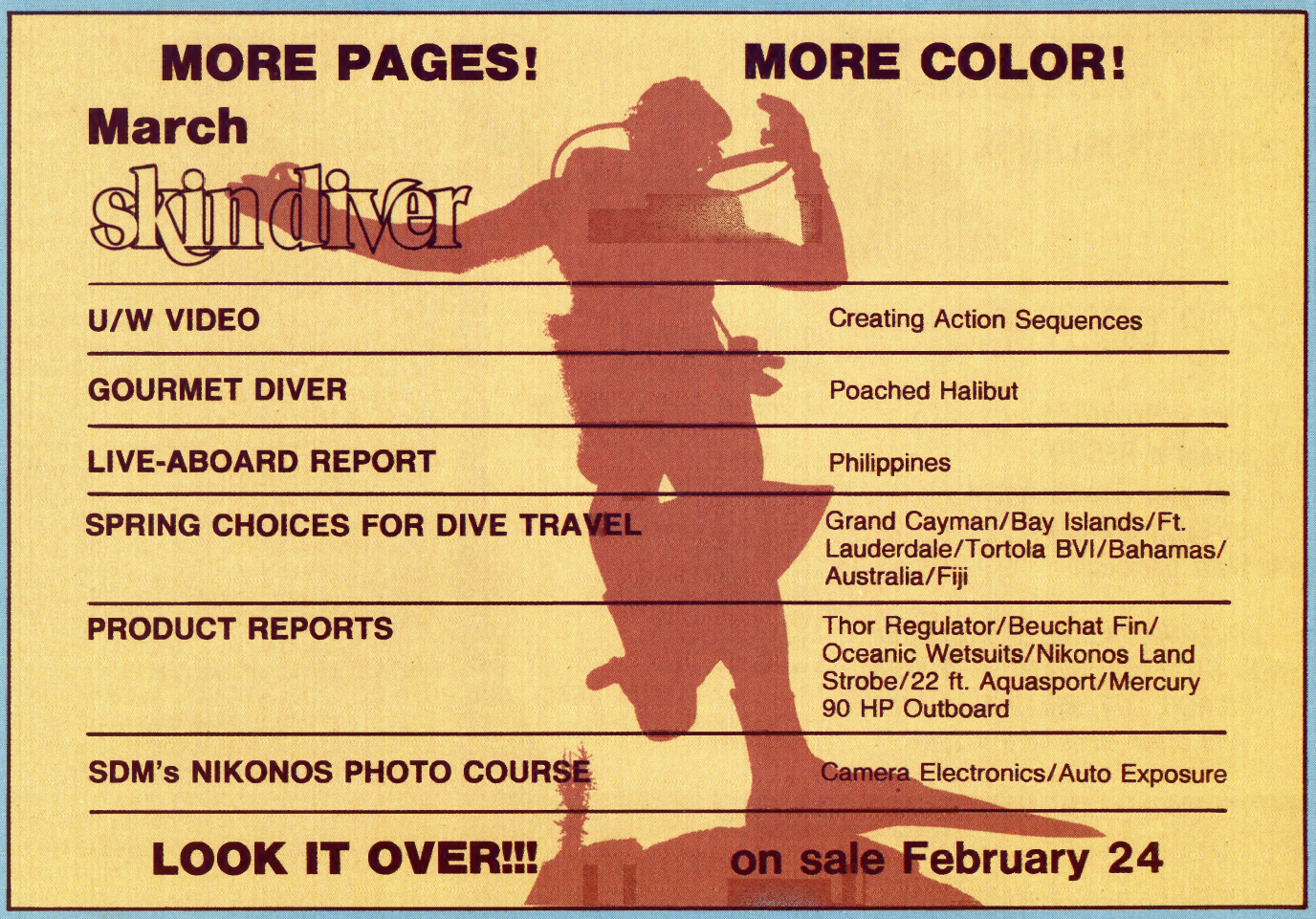
Lost Wally is an impressive wall dive in 70 feet that features a giant green and yellow tube sponge. The face of this wall is painted with red encrusting sponges and many other colorful formations.

Three Sisters is a favorite dive at East End. These are pinnacles not more than 50 yards apart, right on the edge of the drop-off that begins in 50 to 60 feet of water. They are about 70 feet in diameter and almost 90 feet tall. The three pinnacles have bright red sponges growing on their sides.

One of the more popular dives of the East End is **Tunnel of Love**. West of the Cayman Diving Lodge, it features a long tunnel that runs from the top of the reef to the outer face of the wall. The tunnel starts at 60 feet and slopes downward to 125 feet where it exits on the vertical face of the drop-off. It is approximately 12 feet in diameter and perhaps 75 feet long.

Swimming through the tunnel is a memorable experience, but bursting out of it onto the vertical face of the wall is exhilarating. The face is festooned with a colorful display of sponges, deepsea gorgonians and other lovely forms of marine life. Divers often see eagle rays, big groupers and snappers cruising along the wall as they exit the tunnel.

River of Sand is one of those giant sand ravines that looks like an underwa-



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ter glacier. It begins at a depth of 45 feet, with a field of perfectly white sand more than 100 feet wide. The river slants downward on a 45 degree angle and narrows into a funnel shaped canyon only 10 feet wide at the 100 foot level. At this point it spills over a lip and out onto the vertical face of a drop-off. The coral reef on both sides of the sand river is loaded with marine life including anemones, coral shrimp, arrowcrabs and hundreds of colorful sponges.

The Maze is just east of the Cayman Diving Lodge and takes only five minutes to reach by boat. It is a remarkable drop-off featuring an intricate series of intertwining coral canyons that are very narrow and fairly deep. The top of this drop-off begins at 55 feet and the top of the wall is a chain of mountainous coral hills. These are segmented by a number of very narrow winding crevices, barely wide enough for one diver to pass. Some of these canyons are 60 to 80 feet deep and more than 100 feet long. They seem to meander in aimless directions, with many canyons connecting to others. The walls of these narrow passageways are often lined with black coral trees, deep-sea gorgonian fans and tube sponges.

Most of the coral canyons empty out onto the vertical face of the drop-off. There are many excellent macro photography subjects here including bright red wire coral with snow white polyps, green finger sponges with yellow anemones, and black gorgonian fans. The colors of the sponges in this area are also unusual. For example, there is a creamy white vase sponge with a red rim, an almost fluorescent lime green tube sponge and several heart-shaped pink vase sponges.

Directly off the Tortuga Club, **Cinderella's Castle** features many tunnels and ravines in which to wander. Much of the reef structure here is formed like a mesa in that there are vast sections beginning just 30 feet deep and falling off abruptly to a sandy or coral rubble bottom 60 feet down. The reef has many tunnels, gulleys and caverns. Divers have shallow reefs and semi-deep caves and tunnels all in one dive. Large parrotfish and groupers can be found in the passageways.

The Chimney is still another drop-off that features an unusual tunnel formation. The top of this wall starts at 50 feet and drops vertically into the blue. At a depth of 135 feet there is an entrance to a small tunnel on the face of the wall. The opening is approximately seven feet in diameter and the tunnel goes horizontally into the reef for at least 40 feet. At this point, the tunnel makes an abrupt 90 degree turn and ascends in a vertical shaft. The chimney travels upward 70 feet and

emerges at the top of the reef, close to the edge of the drop-off.

CAYMAN BRAC/ LITTLE CAYMAN

The Sister Islands of Cayman Brac and Little Cayman lie 70 to 80 miles northeast of Grand Cayman. They are part of the same geologic formation, just a couple of mountain peaks away. The two are almost twins, similar in size and shape.

Cayman Brac is sort of a string-bean shaped island 12 miles long and one mile wide. The west end is flat and almost at sea level, while the east end rises to a 100 foot limestone bluff that falls away into the ocean. The population of Cayman Brac is approximately 1,100. The pace is really laid-back and the island folks are especially friendly.

Little Cayman is even smaller in size, measuring nine miles long and one mile wide. It is completely flat, with several areas occupied by salt ponds and mangroves. The island is a perfect sanctuary for birds and other fragile forms of wildlife. This outpost in the Caribbean has a resident population of less than 30.

Until recently, things were pretty slow on Cayman Brac and Little Cayman, but all this has changed. The advent of an extended jet runway on Cayman Brac has opened these islands to future development. It would appear that Cayman Brac and Little Cayman are about to be discovered by divers, as they stand perched on the threshold of tourism development.

HOTELS

Cayman Brac presently has three hotels, two of which are new or completely renovated. The Tiara Beach Resort was recently purchased by the Divi Hotel Corporation and completely refurbished. It is now regarded as one of the best little dive resorts in the Cayman Islands. Peter Hughes has just finished the design and construction of a completely new facility on the hotel grounds named Dive Tiara. The facility includes a new dive shop, a large boat pier and two new dive boats.

The Brac Reef Beach Resort is a relatively new facility with 40 rooms. This two story hotel features a freshwater pool, air-conditioning, beach bar and tennis. It is close to the Brac marina, with convenient loading for the boats. The Brac Reef Hotel is serviced by Winston McDermott's Brac Aquatics. This dive operation has been in business many years and consists of two boats and a staff of experienced divemasters.

Little Cayman has three small facilities that can accommodate a limited number of divers. Sam McCoy's Diving Lodge is on the western tip of the island and has seven rooms that can accommodate a maximum of 14 divers. The atmosphere



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The Southern Cross Club is a slightly larger beach facility with a total of 10 rooms that can accommodate up to 20 divers. Basically a fishing camp, it also hosts a number of visiting divers.

Pirates Point Resort has a recently refurbished guest house and rustic cottages. Owner/operator Gladys Howard offers all-inclusive dive packages.

BRAC DIVING

There are more than 30 excellent dive sites around Cayman Brac and more are being discovered every year. **Anchor Site** is an exciting wall dive that begins at 65 feet and drops vertically to at least 1,000. The face of this wall is unusually craggy and deeply etched with many canyons, crevices and small tunnels.

The major attraction of this drop-off is a narrow coral canyon which houses a giant, 100 year old anchor. The crevice begins at 70 feet, forming a winding passageway that leads toward the face of the drop-off. At precisely 95 feet, one will find the iron anchor wedged tightly into the narrow crevice. The shank of the anchor is approximately nine feet tall and the flukes measure seven feet from tip to tip. Partially covered by encrusting corals and sponges, the anchor is solidly cemented to the sidewalls of the canyon. It actually hangs four feet above the floor of the canyon and divers can swim under the flukes. It would appear that the anchor was accidentally dropped into this narrow crevice and became so tightly wedged it had to be abandoned.

The **Hobbit** is an enchanting drop-off less than one-quarter mile east of the Tiara Beach Hotel. It was named after the classic written by J.R.R. Tolkien because of its fairyland appearance. The top of the wall begins at 70 feet and features a number of bizarre looking sponges. There are several giant barrel sponges measuring four feet in diameter and standing six feet tall. These are mostly on the top of the wall. The fish life is extremely active and includes blue runner jacks, barracuda and ocean triggerfish.

An inshore dive site to the southwest of Hobbit is a medium depth reef known as **Wind Sock**. This spot is best known for its elkhorn formations, tall pillar coral and staghorn beds. There are huge mountainous cones of star coral with a wreath of staghorn at the base of each. Dive depths range from 25 to 50 feet. This reef is honeycombed with crevices, archways and overhangs that create some dramatic angles for U/W photography. There are also numbers of damselfish, blue chromis, trumpetfish and butterflyfish.

Airport Wall is a vertical drop-off starting at 65 feet. The top of the wall is loaded with seaplumes and seawhips, clusters of tube sponges and deep water gorgonians. The fish life is active with small reef fish and French angelfish.

At the very western tip of the island, there is a 90 foot drop-off known as **End of the Island Reef**. On the north side of the island is a popular dive known as **East Chute**. The main attraction here is an old Spanish anchor resting in 90 feet, hooked on the edge of the wall. Lying directly north of the local cemetery, is a drop-off called **Cemetery Wall**. This dive features a number of large basket sponges, yellow tube sponges and excellent visibility. The wall starts in only 45 feet where there are large mounds of star coral, tube sponges and seawhips.

Radar Reef is only 150 yards from shore and can be dived from the beach or by boat. Diving depths range from 30 to 60 feet. This reef is a series of rolling coral ridges with sand canyons in between. One large coral mound towers over the rest of the reef and is a haven for a school of snapper and two large Bermuda chubs. There is also a 75 foot tunnel that goes under the coral reef, makes an upward turn, and exits in the center of the coral formations. The reef is loaded with seafans, gorgonians, sponges and star corals.

Another popular site that can be reached by shore or by boat is **Duppy's Reef**. Diving depths range from 25 to 40 feet. This reef is a series of large coral ridges on a white sand bottom. There are yellow tube sponges and many medium sized barrel sponges.

Other popular dive sites on the north side of the island include: **School House Wall**, a vertical wall drop-off; **Grunt Valley**, a 50 foot shallow coral reef; and **Squirrel Reef**, a 40 foot deep reef.

LITTLE CAYMAN DIVING

Most of the diving at Little Cayman is done off the North Shore at two basic areas—Bloody Bay and Jackson Point. Both are regarded as some of the finest wall diving in the Caymans and Bloody Bay is indeed the most unique drop-off formation in the entire Caribbean. The wall here begins at 20 feet and plummets vertically to 900.

Bloody Bay Wall is considered the most breathtaking drop-off in the Caribbean. In fact, it has often been described as one of the Seven Underwater Wonders of the World. This unusual drop-off begins at the remarkably shallow depth of 22 feet and drops vertically to 600 feet and beyond. The most prominent feature of the wall is the spectacular array of exotically colored sponges. A rare form of platinum yellow pipe sponges can be found here in great abundance, with brilliant specimens growing every 10 feet or so along the face of the wall. Azure cup



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and pink vase sponges are equally plentiful. There are also many lovely formations of cream colored vase sponges, emerald green tube sponges, red finger sponges and black coral trees. The face of the wall is a veritable Garden of Eden with marine life so unique it is not duplicated anywhere else in the Caribbean.

Little Cayman Wall is two miles east of the western tip of the island. The length of the wall is about one mile long, starting in 20 feet of water and dropping vertically to 700 feet or more. Hundreds of sponge species grow on the wall in a myriad of colors. There is a tremendous proliferation of azure vase sponges—growing all over the wall—at different depths and in various sizes and shapes.

The top of the reef is thickly carpeted with a beautiful coral garden. Large purple seafans, tall seaplumes and slender gorgonians are everywhere. There are also a great many brain corals, yellow pipe organ sponges and button corals.

Three Fathom Wall is a small section of Bloody Bay Wall that comes up to within 18 feet of the surface. It is one of the only vertical drop-offs in the Caribbean that can be easily dived on snorkel! The face of the wall in this area is somewhat broken by several small canyons and crevices. There is one winding ravine at a depth of 60 feet that finally turns into a coral tunnel and leads to a high vaulted cavern beneath the reef. A small opening in the roof of the cavern allows sunlight to illuminate the interior. The face of this drop-off is also loaded with exotic sponges and large black coral trees.

The top of the wall is a beautiful coral sea garden filled with gently swaying seafans, feathery seaplumes, swaying seawhips, brain corals and sponges of every type. Depths along the top of the reef range from 15 to 20 feet and the area is loaded with all types of invertebrates. Many photographers spend the remaining portion of their wall dives browsing through this lovely sea garden and shooting macro while they decompress.

The Chimney is typical of the Bloody Bay Wall sites. The drop-off begins at 20 feet and drops sharply to 900 feet. The face of the drop-off is almost a smooth vertical wall, etched with a few small ledges, crevices and tiny caves. Magnificent formations of colorful tube sponges grow out from this perpendicular face and there is an occasional tree of splendid black coral. The top of the wall is a lush coral garden filled with hard corals, soft gorgonians and a myriad of small sponges. The fish life is rich and quite friendly, especially along the very rim of the drop-off. Underwater visibility at this spot ranges from 100 to 150 feet. This site is marked by a vertical tunnel that runs from the top of the reef down 100

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feet and is filled with lush marine life.

The **Jackson Point** area is farther east of Bloody Bay Wall. The area is actually a collection of sites that include: **School Bus Reef**, Jackson's Reef, The Labyrinth, **Ramparts**, **Magnificent Reef**, **Magic Round About** and **Anchor Reef**.

Jackson's Reef begins at 50 feet and tumbles downward in a fascinating conglomeration of high coral heads, narrow canyons and sheer walls. This jumbled terrain provides endless hours of fascinating exploration. It is doubtful that anyone can fully appreciate it in one dive.

The Labyrinth is a vertical wall drop-off with canyons. There are huge, iridescent tube, large pink vase and blood red sponges literally hanging from the branches of black coral trees. Divers frequently report seeing large schools of horse-eye jacks swimming down the face of the wall.

LIVE-ABOARD DIVE BOATS

Another unique aspect of Cayman Islands diving is its wide selection of live-aboard boats. Their number has quadrupled in less than five years. There are now four splendid vessels: the 110 foot *Cayman Aggressor II*, the 110 foot *Cayman Aggressor III*, the 65 foot *Little Cayman Diver* and the 112 foot *Ports of Call*. All offer extended range dive cruises including regular visits to Little Cayman's spectacular drop-offs.

Although live-aboard dive boat cruises still represent a very small segment of the total diving vacation activity in the Caymans, they are becoming an increasingly popular way of getting the most diving from a one week visit. The obvious advantage is that an on-site diving/hotel facility can offer more dives per day and more dives per vacation dollar.

A typical live-aboard can offer as many as four dives per day plus night dives almost every evening. While most island visitors are satisfied with a couple of morning dives and perhaps a third dive in the afternoon, there are divers who are far more energetic and ambitious. They prefer to make four or five dives per day. This type of vacation is frequently described as advanced dive travel because it is specifically designed for the serious enthusiast who is in good physical condition. While the cost of a one week live-aboard cruise may be substantially more than an island hotel package, the extra dives are certainly worth the added cost.

There are, of course, many additional advantages to the live-aboards. The most important single factor is the opportunity to dive the more remote areas of the Cayman Islands. For example, the *Cayman Aggressors* (both II and III) devote a great deal of time to exploration of the fabulous North Wall, toward the remote eastern end of the island. Here, the wall often begins at 35 feet and the marine life is spec-

CAYMAN BRAC

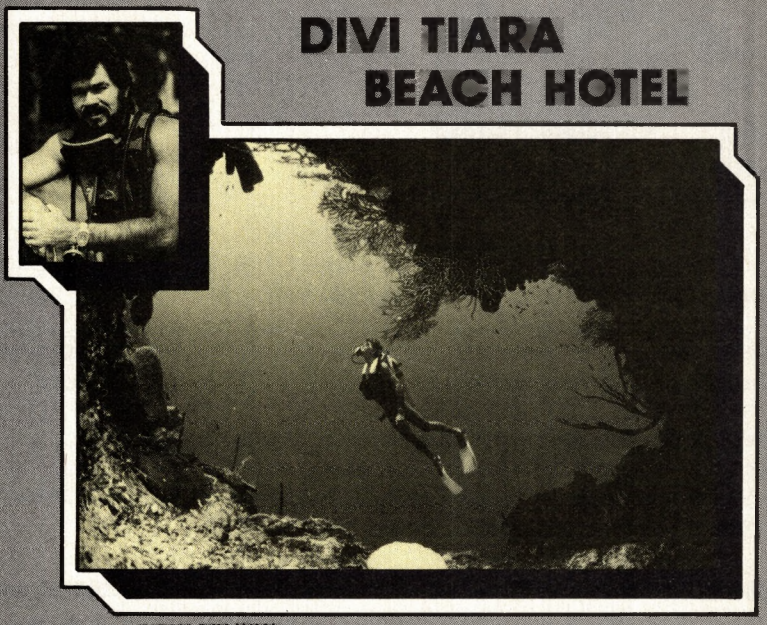
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tacularly lush. Other virgin areas frequented by the *Aggressors* include the East End barrier reef, the south side wall and Little Cayman.

The *Little Cayman Diver* generally operates out of Cayman Brac and spends much of its time cruising the breathtaking walls of Little Cayman. Most of its crew members are from the Brac and their knowledge of this area is superb. While the *Ports of Call* operates out of Grand Cayman, it devotes most of its cruising time to the waters around Little Cayman, as this island paradise is still untouched by commercial development.

Still other advantages of the live-aboard experience include the convenience of diving. Personal scuba gear is never far from the water and dives require a minimum of hassle. Service on live-aboards is very personalized and a family atmosphere often develops during

INFORMATION

Brochures and more information about the Cayman Islands are available by contacting the Cayman Islands Department of Tourism.

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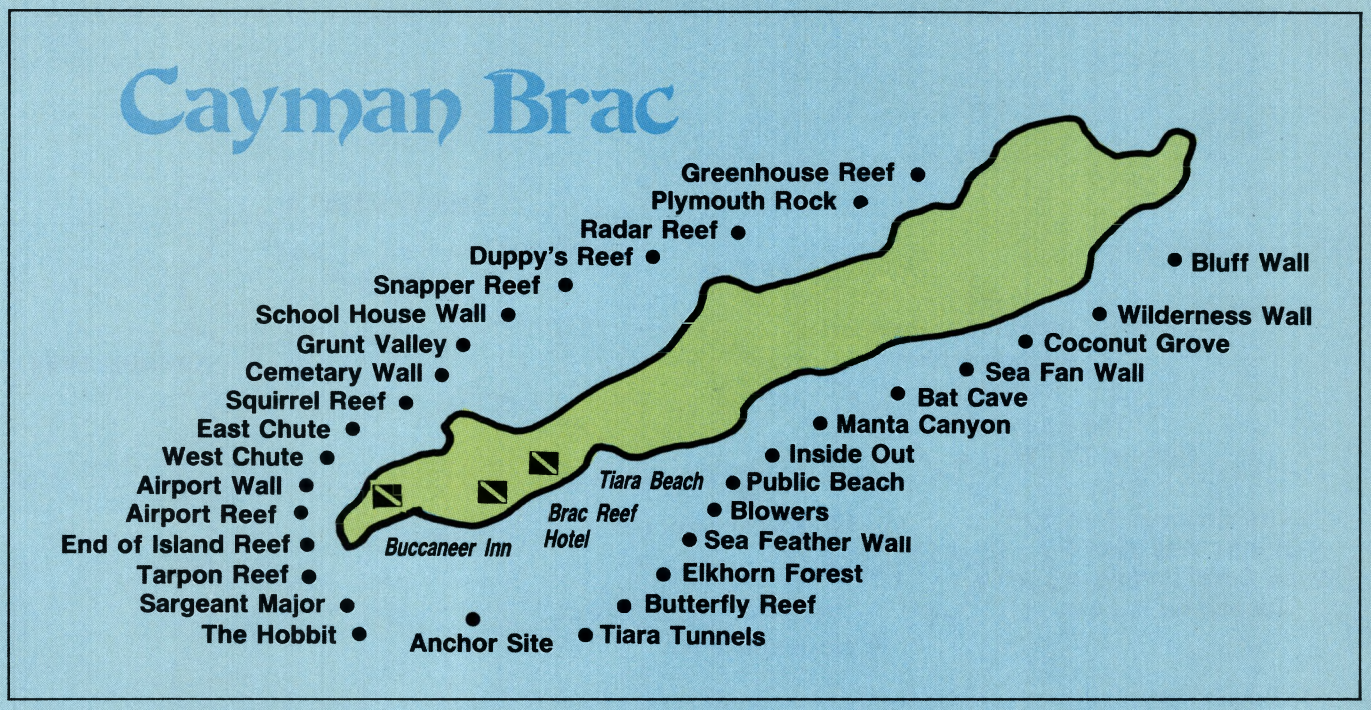
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the cruise. For underwater photographers, the live-aboard is often the answer to many special needs. There is ample room for storage and maintenance of cumbersome underwater camera equipment. Some live-aboards, such as the *Cayman Aggressors*, are equipped with



film processing labs and camera rental departments. Underwater photographers have an opportunity to dive and film in Cayman's clearest water and among its most beautiful reefs.

CONSERVATION LAWS

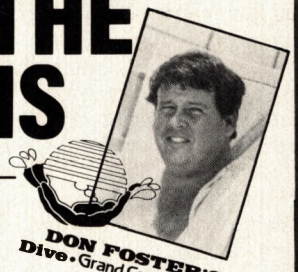
The residents of the Cayman Islands have long been aware of the importance and the value of their undersea reefs and marine life. Ever since the islands were first settled, Caymanians have depended on the sea for their livelihood. Generation after generation has worked on or under the sea as sailors, sea captains, fishermen and now as divemasters. The Caymans' present and future prosperity depends upon the preservation of this fragile resource.

In 1978 the Cayman Islands government instituted a strict code of Marine Conservation Law. These regulations protect many marine life species and also control the means by which more abundant marine life may be taken by tradi-

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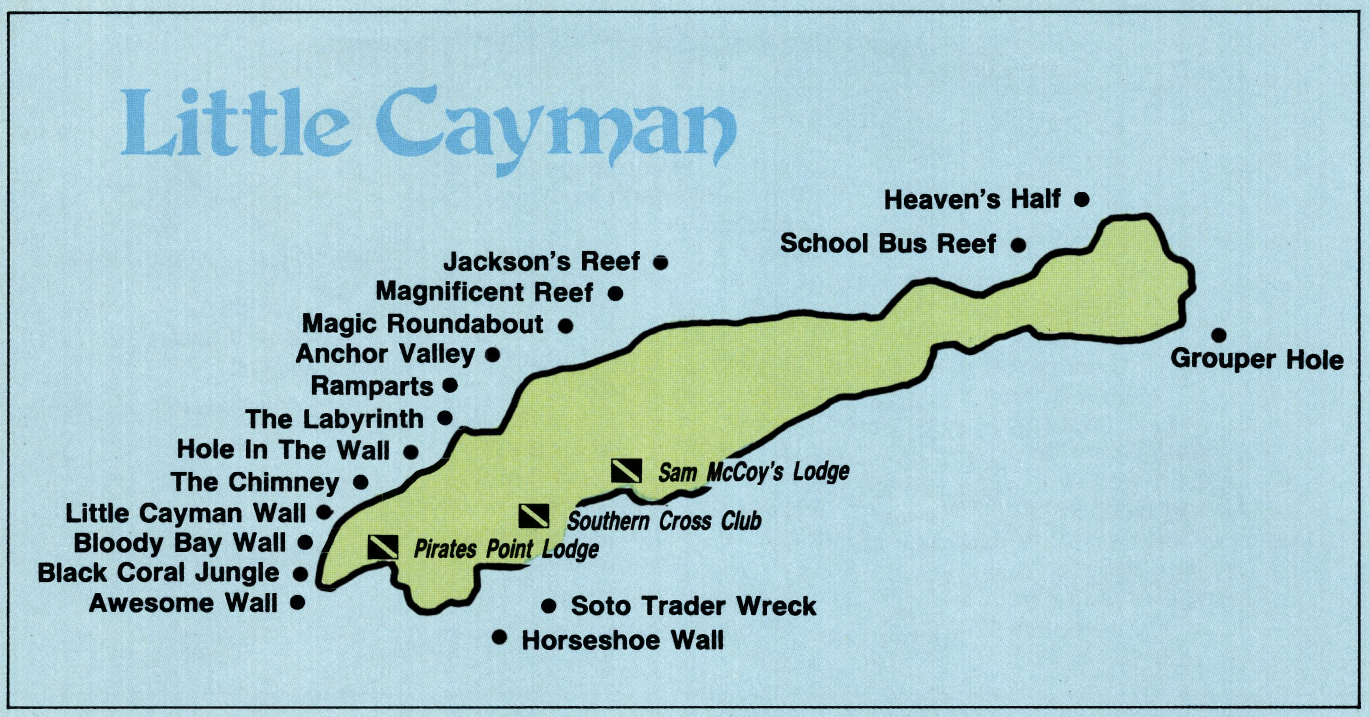
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tional fishermen.

The single most important regulation is the prohibition of taking any type of corals or sponges anywhere in Cayman waters by anyone. Violation of this law carries a maximum penalty of a $5,000 fine and one year in prison. As you can see, the Caymanians are serious about marine conservation.

There is also a law strictly prohibiting fishing with any type of poison or other chemicals (such as bleach) and no one may take live fish for the purpose of export for aquariums.

Spearguns and seine nets require a fishing license and are subject to controls as to where they may be used and precisely how many fish may be taken. These fishing licenses are limited to Caymanians and long term residents of the island. Special areas have been set aside for this type of activity. Maximum limits and minimum size requirements strictly regulate the taking of lobsters (by Caymanians) during a specified season. There is also a maximum limit on the taking of conch. Turtles and turtle eggs are also protected by these regulations.

MARINE PARKS

In February 1986 the government further established laws and regulations for a complete and comprehensive system of Marine Park Zones, strategically placed throughout Grand Cayman, Cayman Brac and Little Cayman.

Working in conjunction with the Cayman Islands Watersports Association, the government is installing and maintaining a system of permanent moorings at all popular dive sites. The purpose of these moorings is to prevent coral and sponge damage by the continual daily anchoring of dive boats. In addition, the divemaster is required to advise guests of the basic marine conservation laws prior to their entering the water.

A brochure is available that clearly specifies all conservation regulations and indicates the Marine Park Zones.

The Cayman Islands government has established an interesting marine management system by dividing the reef areas into four separate and distinct types of zones: 1) Marine Park Zone; 2) Replenishment Zone; 3) Environmental Zone; 4) Animal Sanctuary. Each has its own restrictions and regulations.

The Marine Park Zones are those areas in which much of the diving is done, as they encompass a number of wall diving sites and shallow coral reefs.

The Replenishment Zones are fisheries management areas where stocks of conch and lobster can breed and reproduce. The theory is that the eggs and larvae from these replenishment areas will spread throughout the reefs of the Cayman Islands and repopulate depleted areas. Replenishment Zones are some-

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LOCATION	— 86 miles NE of Grand Cayman, one mile east of Little Cayman
LENGTH	— 10 miles
WIDTH	— 1 mile
ELEVATION	— 140 feet, bluff at east end
ROADS	— Paved
POPULATION	— 1,100
CAPITAL	— Stake Bay
AIRPORT	— Paved, recently extended
AIR SERVICE	— Daily from Grand Cayman, twice weekly from Miami
LODGING	— Three hotels
SHOPPING	— Local island crafts

LITTLE CAYMAN

LOCATION	— 79 miles NE of Grand Cayman, one mile west of Cayman Brac
LENGTH	— 9 miles
WIDTH	— 1 mile
ELEVATION	— 40 feet/flat limestone island
ROADS	— Graded coral
POPULATION	— 27 permanent residents
CAPITAL	— Blossom Village
AIRPORT	— 3,300 ft., grass, no control tower
AIR SERVICE	— Twice weekly from Cayman Brac charters from G. Cayman anytime
LODGING	— 2 hotel/guest lodges
SHOPPING	— None

what temporary and are designed to bring the marine life back into balance.

The Environmental Zones are areas of great ecological importance in basic marine life development. These encompass large tracts of mangroves and shallow turtle grass that serve as nurseries for juvenile fish. They are also important nesting areas for various types of birds.





The final and most precious zones are those designated as Animal Sanctuaries. These are mostly ponds, wetlands and rookeries that are totally off limits for hunting, collecting or littering. With this system of four separate Marine Park Zones, the Cayman Islands hope to fully preserve their natural resources and even help them to flourish.

The following are just a few basic suggestions for visiting divers:

1) Please, do not take any kind of marine life. Whatever you take will not be there for the next person to enjoy.

2) If you dive or snorkel, please watch your buoyancy. Don't crash into delicate coral, don't stand on it, don't break it. It grows incredibly slowly—one millimeter per year for many types. The fastest growing coral, staghorn, grows only a few inches per year.

3) Please don't litter. A soft drink can tossed off a boat doesn't go away. It sits on the bottom for everyone to look at.

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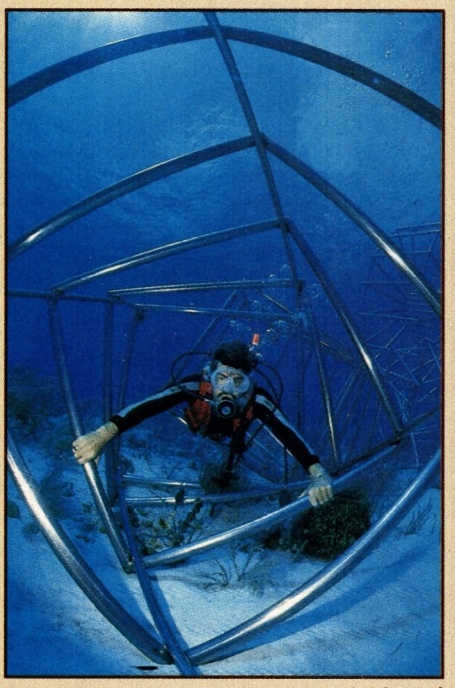
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SEA DWELLERS

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TEXT AND PHOTOGRAPHY BY RICK FREHSEE







Ross Nathan Power swims through his stainless steel sculpture at the Key Largo Undersea Art Gallery. T.J. and Jan Holub are the genial hosts at Sea Dwellers Dive Center, on U.S. 1 at mile marker 100, Key Largo—the closest key to the mainland.

Only one-half hour south of Miami, U.S. Highway 1 turns into the Overseas Highway and the Florida Keys. The transition is impressive: Gone are the buildings, the urban sprawl and most signs of civilization. The Keys remain a bona fide wilderness—a place for the heron and the egret, the grunt and the grouper, the diver and the fisherman.

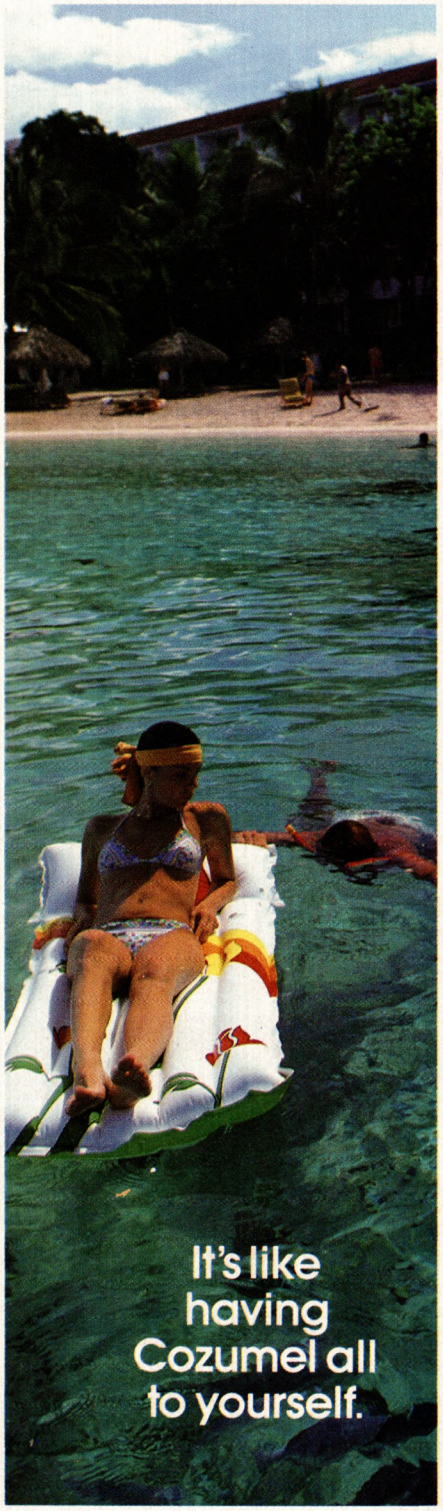
Along both sides of the highway dive flags are on display almost continuously. Divers and reef fish decorate billboards and fast food restaurants feature underwater prints and murals. There is more diver influence and spectacle in the Florida Keys than perhaps anywhere else on the planet—all for good reason. These are the islands you can drive to. And, offshore is a series of splendid reef formations roughly parallel to the island chain. The Keys are a popular paradise for vacationers and more than 250,000 divers visit them annually.

The first major island is Key Largo. Filled with Humphrey Bogart nostalgia and Jimmy Buffett imagery, Key Largo is sailboats, sunsets, pizza, piña coladas and good times galore. Key Largo today is still quite rural but there are pleasant hotels, restaurants, marinas, shopping centers and condos along the way. Because of the closeness to South Florida cities and because of the Key Largo National Marine Sanctuary, which protects the reefs offshore, this island is the most popular dive area in the Keys. There are more than 20 good dive operations along the less than 20 miles through Key Largo. Charter dive boats dominate the boat slips and waterways.

One of the very best of these operations is the Sea Dwellers Dive Center at Mile Marker 100. Sea Dwellers has been in operation nearly 15 years and is still run by its founder T.J. Holub and his wife Jan. T.J. is a licensed commercial pilot, a scuba instructor, a past president of the Florida Keys Association of Dive Operators and a salty skipper who, with Jan, lives on a boat at Ocean Reef Marina. Jan, also a licensed commercial boat captain, manages the dive center and accompanies T.J. on "vacations," running crew boats out of New Orleans.

What's more important is they are excellent hosts who represent perfect images of the Florida Keys dive skipper. Quick with a smile and a joke, T.J. has endeared himself to hundreds of visitors who have made Sea Dwellers their vacation choice and home away from home.

The center of the operation is an attractive, nautically-dressed building just off the main highway. Inside is a full service dive station complete with a tropical boutique and full photo/video facility. Diagonally across the street is a canal with the *Sea Dweller III* charter boat docked next to the Key Largo



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SEA DWELLERS

Holiday Inn. The Sea Dwellers/Holiday Inn combo is perfect. The beautiful Holiday Inn is a well-appointed vacation hotel complete with a spacious pool and lighted tennis courts nestled in lush tropical landscaping. The Greenstreets Dining Room and Casablanca Lounge echo the Bogart tradition and 132 comfortable rooms and suites handle the thousands of divers who stay here during the year. The management is dive oriented and offers singles, doubles or large groups comfort and efficiency. Logistically it would be difficult to find a more ideal arrangement. The 50 foot, twin diesel *Sea Dweller III* is a short walk from your hotel room. Retail sales, equipment rentals and support services are across the street. The best reef sites are only 30 to 45 minutes away.

Sea Dweller III is a straightforward commitment to diver efficiency and safety. U.S. Coast Guard certified for 46 passengers, the vessel is equipped with tank racks, wash buckets, storage areas and a large rear platform. The well designed T-ladders on both sides of the dive platform allow divers to climb aboard without removing their fins.

T.J. and Jan rely on additional captains to help with the daily reef trips. Shop manager Bobby Easom coordinates boat assignments between captains Ken Vaughn and David Shaever. T.J. is still occasionally pressed into service with groups who return to cruise and dive with him specifically.

The fish life in the Florida Keys always amazes me. The reefs of Key Largo are impressive but the fish generate the motivation to return time and again. The sightseer or photographer will be mesmerized by the flowing movements of thousands of grunts, snappers, goatfish and yellowtails that hover over the coral seascape. Angelfish parade by emerald seafans, rockbeauties contrast with orange encrusting sponges and midnight blue parrotfish swim through golden elkhorn coral formations. Beneath ledges and overhangs are spotted drums, spotfin butterflies and fairy basslets displaying exotic colors and shapes.

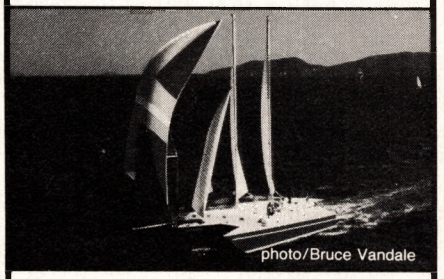
Nurtured by the Gulf Stream and warmed by the tropical sun, the shallow reefs of Key Largo provide an incredible nursery for schooling fish, reef tropicals and marine invertebrates. Although an occasional winter northwester can reduce visibility seriously, when conditions are normal to excellent, the Florida Keys present a world class diving environment. It's hard to beat the reefs and caves of French Reef or the fish life at Molasses Reef, but there are literally hundreds of

(Continued on Page 110)

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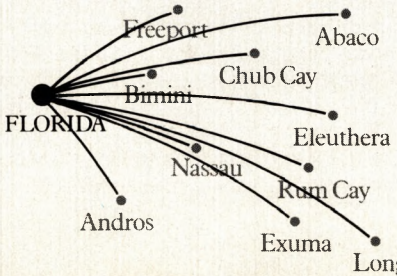
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WEST END GRAND BAHAMA



Freeport's Diving Alternative

TEXT AND PHOTOGRAPHY BY STEPHEN FRINK

The beauty of the dive sites off the West End of Grand Bahama Island has long been a lure to live-aboard dive vessels. Given the mobility and range of these floating resorts, they need choose only the best spots. It is an endorsement of the highest order that the legendary dive areas such as Memory Rock, the Sugar Wreck, Sherwood Forest and Tarpon Caves are highlights of their Grand Bahama itineraries. Now it is possible to enjoy this same underwater enchantment from a land base with the professionalism of the Underwater Explorers Society. UNEXSO has opened a branch of their famous Freeport dive facility at the Jack Tar Village. This addition provides access to the West End either as part of a dive/lodging package with UNEXSO and the Jack Tar Village or as a day dive excursion from Freeport.

UNEXSO offers complete reciprocity of dive privileges between the two operations, the obvious benefit of which is significantly expanded dive options. In addition, since Freeport is on the eastern shore and the Jack Tar Village along the western coast, it is unlikely the same prevailing winds will affect both sides of the island. Consequently, one side or the other will always be in the lee should the winds kick up and a protected diving area will always be accessible to UNEXSO customers.

Divers who choose the Jack Tar Village as their base for West End adventure will enjoy a tropical 2,000 acre resort complex. The modern hotel accommodations include: 525 air-conditioned double rooms; an absolutely massive swimming pool; tennis courts; a 27 hole golf course with carts and clubhouse; shopping arcade; various dining rooms and lounges; poolside bar and grill; game rooms; bicycle shop; marina; watersports concessions; and even a paddlewheeler for sunset cruises and island excursions.



Now divers can explore the famous sites at the West End of Grand Bahama Island from a convenient land base of operation at UNEXSO's Jack Tar Village facility. Top: Eye to eye with a scorpionfish at Sherwood Forest. Above: Gray angelfish at Memory Rock.

Jack Tar Villages are found on Grand Bahama, Jamaica, the Dominican Republic and St. Kitts. Each is structured along an all-inclusive format. For the very reasonable package price, air fare is included from their tour bases in Denver, Toronto or Dallas. Once on the island virtually everything else is also included: Hotel rooms, all meals, ground transfers from their 8,000 foot airstrip at West End, drinks (including cocktails, beer, wine and soft drinks), gratuities, sailing, tennis, drift fishing, snorkeling, green fees, caba-

ret shows, water skiing and much more is all included in the prepaid package. The only extras that might be incurred are duty free shopping, parasailing, golf cart rentals and dive tours. Snorkeling gear for use off the beach is included in the standard package and a special dive package is also available through UNEXSO featuring two boat dives daily and use of all dive equipment. It is, of course, possible to book the dives á la carte at West End Diving Center or schedule them as part of the package from the Freeport UNEXSO base.

The dockside West End Diving Center has compressors and ample rental gear, an amiable and qualified dive staff directed by Ron McCaslin, and the 28 foot diesel V-hull dive boat *Easy Diver*. The *Easy Diver* can accommodate 24 divers, but the typical load at West End is probably 12 or less. The vessel is well suited to diver convenience with tank racks, dive platform with extended ladder, Loran C, depth finder and VHF radio. There are covered areas within the boat for protection from the sun or spray as well as open areas for sunbathing. While most of the dive sites around the resort are within 10-15 minutes of the dock, certain sites in the vicinity of Memory Rock are a 90 minute boat ride. These more distant dives are typically conducted as a two tank day trip with picnic lunch. The *Easy Diver* makes a comfortable excursion base.

The coral reefs of West End begin within one mile offshore the resort and generally consist of a reef structure at the 30 foot depth characterized by dense concentrations of low profile corals such as staghorn, star, elkhorn, brain and fire. Within these coral clusters are healthy populations of the smaller reef tropicals such as squirrelfish, angelfish, brown or blue chromis, hamlet, butterflyfish, grouper and moray eels.

At the 30 to 60 foot depth the typical coral begins to change somewhat. While the staghorn, elkhorn, brain and star corals are still richly evident, gorgonians are somewhat more prevalent and the profiles of the coral heads rise with deeper surge channels and ledges with coral caves. Lobster are plentiful at these depths, as are stingray, nurse shark, barracuda, spadefish and turtle, all in addition to the tropicals of the shallower reefs.

There is another reef structure discernible in 65 to 80 feet of water, yet still within a 15 to 20 minute boat ride of the resort. This reef is typified by huge coral heads, swim-through caves and a high probability of pelagic activity. Here it is possible to sight blacktip or bull sharks in the distance and divers are likely to view tarpon, schooling jacks in abundance, eagle rays, permit and turtles. While the shallow reefs are beautifully alive and rich with photographic opportunity, these deeper reefs will inspire even the most jaded of the dive community.

During our most recent visit to the Jack Tar Village to dive with UNEXSO we had the opportunity to sample some quite spectacular sites along the 80 foot reef. Tarpon Caves is a beautiful location with massive swim-through caves, a school of at least six resident tarpon, the scattered wreckage of several fishing boats and possibly the largest school of horse-eye jacks I've ever seen. Another of my favorite dive sites off West End is Sherwood Forest. This dive requires a longer boat ride, perhaps 50 minutes, but is definitely worth the time. Here depths range from 60 to 85 feet and the corals are magnificent, bearing absolutely no evidence of diver impact. My most vivid recollection of Sherwood Forest was the shark activity we were able to observe on each of our dives. While we were unable to get close enough to the blacktips to photograph them, with the visibility in excess of 100 feet, colorful sponge encrustation, excellent marine life and vibrant corals, Sherwood Forest was among our most productive photo dives.

Memory Rock itself is but a small, uninhabited patch of rock marked by a navigational light. Its significance to the diving community lies beneath the sea, with a gradually sloping wall that begins at 60 feet and becomes vertical at 120, dropping away to more than 6,000. Here are the massive sponges, clear waters, dramatic corals and abundant marine life that mark the best of Caribbean diving. During our day trip to the Memory Rock area we dove a site called Mount Olympus for our deep dive and found the colorfully encrusted coral canyons at the lip of the wall alive with schooling jacks, eagle rays, barracuda and even a curious jewfish. After our picnic lunch aboard the boat, we especially enjoyed an underwater tour of the scattered remains of the Sugar Wreck. Sunk in only 20 feet of water, the Sugar Wreck was a steel hulled sailing ship and, as the name implies, it once carried a cargo of sugar. The ship went down in 1908 and now lies scattered in three sections over perhaps 200 yards of sandy bottom. The seafloor is absolutely littered with conch and the wreck hosts tremendous schools of grunts, a resident nurse shark, schools of barracuda, parrotfish, grouper, coney, goatfish, angelfish and occasionally, turtles. While there is no apparent superstructure remaining, portions of the wreck such as the windlass, deck plating, masts and ribs are easily indentifiable, if somewhat obscured by encrustation.

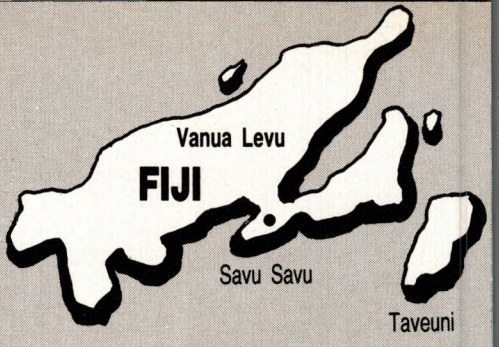
West End Grand Bahama is a quiet, rustic bit of traditional Bahamas culture and the Jack Tar Village is a comfortably complete vacation resort that also happens to be a very good value. Freeport is a comprehensive vacation paradise with beautiful resort hotels, casinos and cabaret shows, fine dining, miles of sandy beach, excellent air connections and professional, sophisticated diving services available through the Underwater Explorers Society. Whichever Grand Bahama base of operation is chosen, West End and UNEXSO will feature superior Bahamas dive opportunities.

For information contact UNEXSO at P.O. Box 5608, Ft. Lauderdale, FL 33310 or P.O. Box F-2433, Freeport, Grand Bahama. You can call (800) 992-DIVE or in Florida (305) 761-7679. In the Bahamas, phone (809) 373-1244.

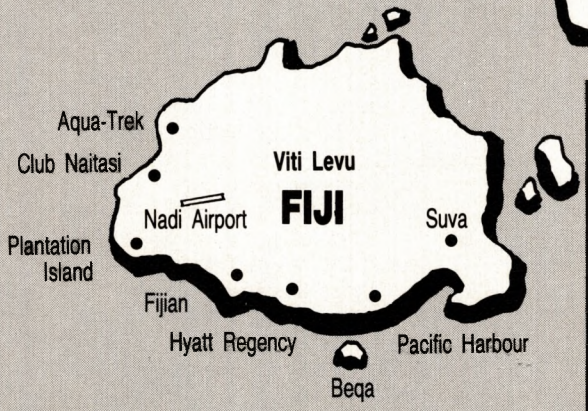


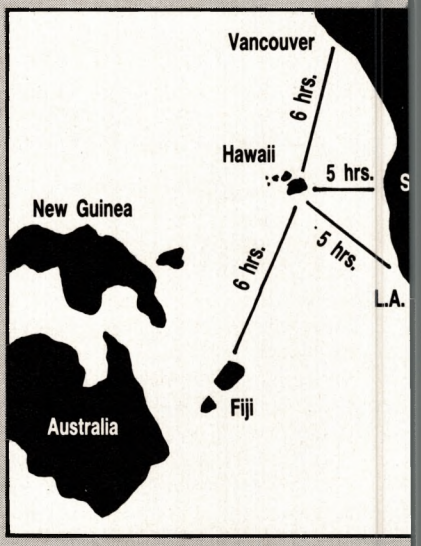
The 28 foot *Easy Diver* can accommodate 24 divers, but 12 or less is a more typical load. Most dive sites are within 10-15 minutes of the dock and trips to others, such as Memory Rock, are conducted as two tank day excursions that include a picnic lunch.

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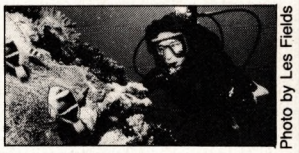


Photo by Les Fields

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AERO COACH

MANATEE AND MAN

In A Moment Of Magic

BY WENDELL M. PATTON, III

As I stood on the deck of the boat I had to keep telling myself I was really in Crystal River, Florida, heart of manatee country—but there was ice all over the boat! Every time I stood still my boots stuck to the deck. I was beginning to realize this trip was going to be different. It would be two days before I would learn just how different.

It was 8:00 am before we got all the equipment and divers loaded aboard the boat and left our berth. We were headed toward King's Spring, about a 15 minute ride. There was an air of excitement as most of the passengers aboard were part of a scuba diving class from Wateree Dive Center in Columbia, South Carolina. Today they would complete their last two checkout dives prior to certification.

The first dive ended and the students were given some free time under the guidance of myself and the instructor. I chose to go with the group that left the spring to view the manatee, the main attraction of Florida's freshwater springs.

The manatee, or sea cow, is a warm blooded mammal that grows to better than 12 feet long and weighs more than 1,000 pounds. When the water temperature of the ocean starts to drop, the manatees head up the brackish rivers, seeking the year-round 72°F warmth provided by the springs. Not a particularly pretty creature, the manatee is thought to have given rise to the stories of mermaids told by ancient seamen. It is now an endangered species and protected by laws with very stiff penalties.

Soon it was time to return to the boat. Gathering up the students, we boarded and returned to the lodge for lunch. On this return trip, a diver who had accompanied us from Columbia spoke of a young manatee that had befriended him that morning. He said it had followed him everywhere he went. I was interested in what he had to say, for the day before I had seen an adult manatee with a young one by her side. I was very anxious to view the pair U/W but had not been able to locate them. Of course there was no way to know if these two calves were one and the same, but it seemed likely.



photos/Andy Ogburn

Docile and harmless, manatees sometimes seek out contact with divers. However, divers may not pursue or harass manatees. The greatest danger to these mammals occurs when they surface to breathe. Then they are vulnerable to boat propellers.

After lunch break we returned to the spring. Since this was the last checkout prior to certification, all the conversation centered around what each buddy team was going to do during free time. I was hoping the young manatee seen that morning had not left the area.

There is something wondrous about being in the water with a manatee. Their massive shapes glide through the water with amazing agility and grace. Large animals with small heads, their eyes are almost human in appearance. At times I swear they are able to communicate with man. There is no question when one of them wants to make contact and it's like making a friend for life. Once the bond is established, that particular manatee will pick you out from a crowd of other divers. I've seen it happen too many times to believe it's accidental. They seem to know who can be trusted to accept the contact for what it is—a meeting of man and animal. It's something special, something to be treasured.

With the last of the skills training behind them, six buddy teams went off to explore the wonders of the underwater world on their own. I headed out of the spring in search of the mother manatee and her young one. About 100 yards or so out of the spring I spotted the diver I had spoken to at lunch. With him, was the young manatee. I settled to the sandy bottom about ten feet away.

The diver saw me and swam over. As he had said it would, the young manatee followed. Now I don't know if the manatee was a he or she, but I prefer to call it a he. Anyway, he swam over to us and I could see his eyes examining me. He would approach my extended hands, then back off at the last moment. After several tests he came straight to me, nudging, pushing and rolling on his back to expose various areas of his body to rubbing. He reminded me of a puppy. His favorite activity was to come between the other diver and myself and lie on the bottom. As we scratched and rubbed oppos-

(Continued on Page 112)





Guests relax in front of the poolside cafe at the Colonnades Beach Hotel. The hotel also offers beach volleyball and tennis.





Left: Divers enter the water from the *Shark Killer III*. Above: Renee Kauffman on the *Owens* wreck. The 120 foot ship was formerly the *Eidsvag*. Bottom: The *Island Fantasy*, *Shark Killer III* and *Little Fantasy*.

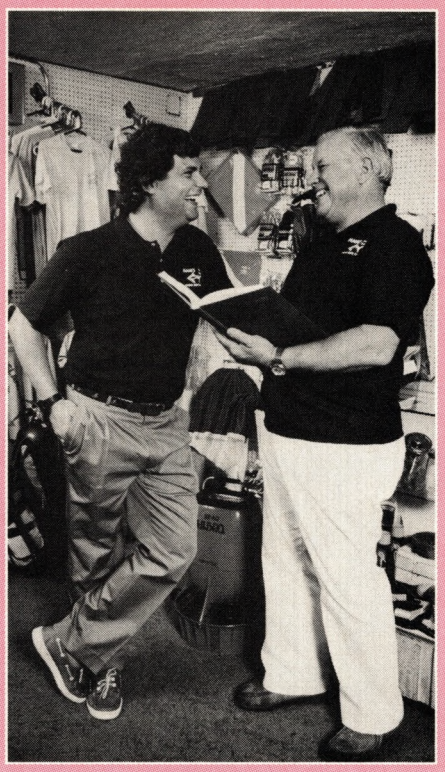
Riviera Beach Holiday

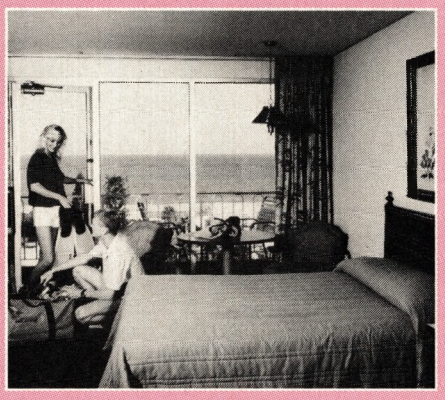


When Frank Hammett initially wanted to look at the underwater world, he had to make his own mask. A couple of decades later, his equipment has changed dramatically, but Frank is the same. He still enjoys diving the same reefs he first saw more than 20 years ago. After all that time, even for someone as enthusiastic as Frank, a diver would had to have found a locale that continually delivers new surprises, dive after dive, year in, year out. As most Florida divers know, Palm Beach is such a place.

From the equator, the Gulf Stream flows northward to the Florida peninsula. At Palm Beach County (which includes Singer Island and Riviera Beach), the







Above: Ro Lotufo and a friendly moray eel at Paul's Reef. Above right: Frank Hammett (right) owner of Frank's Dive Shop, and Frank Stora, its operations manager. Stora has implemented several new ideas at the shop, including twilight dives and a dive/lodging package with the Colonnades Beach Hotel. Right: A well-appointed room at the Colonnades Beach Hotel.

Florida's Fishbowl Of The East Coast

TEXT AND PHOTOGRAPHY BY MARK M. LAWRENCE

Gulf Stream comes closest to shore. Here the narrow continental shelf drops off quickly. Together, these conditions create an exciting diving environment within one to three miles of shore that is constantly swept clean and renewed by the Gulf Stream. Visibility rarely drops below 40 feet and may exceed 100 feet.

These same nutrient-rich waters feed the base of an enormous food chain. Ask Florida divers what Palm Beach is most famous for; they'll probably say large marine life. From late spring until late summer, sea turtles come in to mate and lay eggs. It's not unusual for visitors to spot several loggerhead or hawksbill turtles on one dive. In the winter, schools of migrating fish such as jacks, grouper or Cuban snapper often cruise by. For the patient and persistent, return trips may eventually reward visitors with an U/W encounter with a sailfish or whale shark.

At any time during the year, divers may swim alongside southern stingrays whose wingspan is as wide as a diver is tall. These gentle animals often have several fish in attendance, such as remoras, jacks or cobia. Nurse sharks come in all sizes. The largest may actually be the friendliest and most docile. Frank's guides take great pleasure in showing guests how to pet them.

Perhaps because of the swift-flowing Gulf Stream water, delicate corals don't thrive here. Large basket sponges, deep-water gorgonians and purple seafans dot the rocky ledges. Orange sponges highlight the edges of overhangs and colorful encrusting growth colors the undersides.

At Paul's Reef and Horseshoe, thick schools of snapper and grunts obscure the bottom. Observed from above, each diver seems to be centered in his own swirling doughnut of fish. Horseshoe lies just north of the Lake Worth pier. Although most of the region's reefs travel north and south, this site forms a large bowl across the bottom. From the top at 45 feet, the reef drops into the sand to 53 or 55 feet.

No trip is complete without a dive on Paul's Reef. This beautiful site lies north of Horseshoe. Paul's Reef tops out at 45 feet and drops to 55 on the inside. The outside slope runs deeper. When guides say the fish blanket the reef there, they mean it! Golden and blue trumpetfish seem oblivious to divers' presence. Seafans are common on Paul's Reef and the Breakers Reef. Named for the famous beach resort, Breakers is a long-time divers' favorite. A community of hard and soft corals flourishes here. Swimming from the north end of Breakers to Turtle Reef, divers pass by Neptune's Statue. This monument is dedicated to the spirit of understanding and respect for the ocean. Appropriately, two sea turtles share King Neptune's pedestal.

Farther north stretch the famous Double Ledges. This long system runs several miles. From a top near 70 feet, the ledge drops westward in two steps. The base runs between 80 and 90 feet. Along this ledge are numerous deep cuts and crevices. Pelagic fish seem to follow this reef line like a highway.

Palm Beach also has great wreck diving! Favorites include the 185 foot *Mizpah*. She rests in 87 feet of water. Next to her lies the bow section of the *PC 1170*. Just a short float downcurrent is the *Amaryllis*. Local divers often refer to this 400 foot hull as a giant tub full of fish.

A more recent addition to the artificial reef collection, the 120 foot *Eidsvag* was sunk just south of the inlet. She was renamed the *Owens* in honor of the county commissioner who helped arrange her purchase and placement. The superstructure rises to within 60 feet of the surface; the hull rests in 87 feet. A few kicks put you on Spanky's Barge. Intact and upright, it rises 10 feet from the bottom. Nearby, the Rolls Royce awaits its next passenger. Descending to these wrecks is exciting. Usually the group of divers is greeted by a few yellowtail snapper. Following the guide downcurrent to the ship, visitors often encounter enormous schools of barracuda. The fish hover in tightly packed formations. As the scuba divers approach, the school parts like a curtain drawing open.

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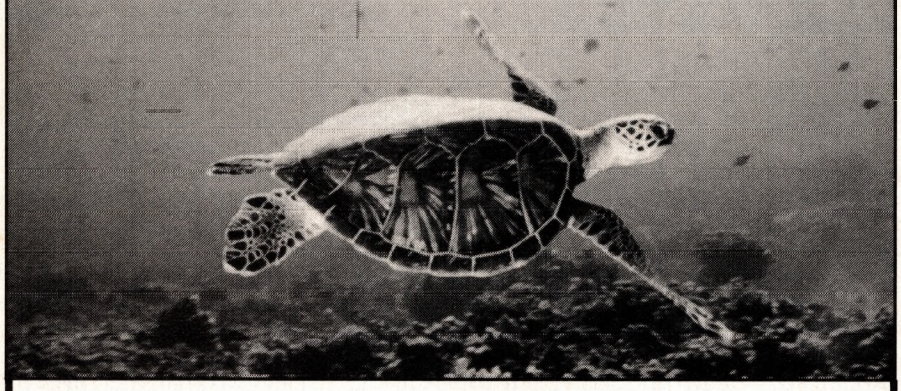
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FRANK'S/COLONNADES

The Gulf Stream blesses the Palm Beaches with good water. It can also bring in strong currents. When people first started diving this area, they anchored their boats; it was not long before these early reef visitors sought new techniques to handle the currents. As Frank put it, "When I first started drift diving, I was hooked. Not only was it easier, but I could cover a lot more reef than before." Drift diving is still the most popular diving style today.

When diving with Frank's Dive Shop on board either the *Shark Killer III* or the *Little Fantasy*, each group of divers has a guide. He/she carries a small grapple hook with a large red float attached to the other end of a 150 foot line. Initially the group descends together, but individual buddy teams can ascend along the line whenever they finish their dive. Back on the surface, the boats follow the floats. Thanks to the wide platform mounted at water level on each of Frank's boats, entries and exits are simple. A divemaster is always ready to help guests back into the boat or lend a helping hand with photo gear or goodie bags.

The *Island Fantasy*, Frank's Dive Shop's luxury live-aboard dive boat, was the inspiration for naming the 28 foot *Little Fantasy*. This latter, a custom-built craft, can carry up to 15 divers. *Little Fantasy* is used for individuals, small groups or classes; its size permits tailoring to the individual's needs. The larger *Shark Killer III* shares some common features with the *Little Fantasy*. Both were custom designed for divers, with commonsense tank racks and easy-access platforms. The 49 foot *Shark Killer* also has large tables for photo equipment and a bar tap with Coke and Sprite. Up forward there is a head. The spacious deck makes it easy to move divers around. Although the vessel is certified for 44 passengers, *Shark Killer III* runs with only 30. Two freshwater hoses are provided to rinse off bodies and gear. Even shampoo is provided!

As with any operation, it's the staff that makes the difference. Like Captain Frank Hammett, Captain Bob Johnson grew up in South Florida. An avid pilot, Bob is just as comfortable landing a twin engine aircraft as he is docking the *Shark Killer III*. When Captain Bob promises that he'll drop the divers on a specific coral head, he does. His easygoing nature complements his obvious skills. The divemasters follow their captains' examples. They're outgoing, friendly and experienced. Prior to working on the dive boats, each divemaster undergoes an extensive apprenticeship to learn the more than 50 dive

sites Frank's boats visit.

For operations manager Frank Stora, running Frank's Dive Shop gives him the chance to mix his experience as a manager of both private and country clubs with his favorite sport. Although Stora maintains close contact with Frank and Dee Hammett, it's clear the owners have confidently given Stora room to implement new ideas. Frank took advantage of daylight-saving time by starting to run twilight dives. These late afternoon trips quickly became the favorite way for local divers to unwind after work. Recognizing the traveling diver's problems, Stora set up a dive/hotel package with the Colonnades Beach Hotel.

On Singer Island's oceanside, the Colonnades Beach Hotel has much to offer. Since it was built in the late '40s little has changed. The modern Seahorse Beach Club is the only exception. The facility acts as the center for all the beach activities. Under the Seahorse's awning, guests retreat from the sun to enjoy tropical drinks and snacks. There's usually a volleyball game on the beach. Visitors who prefer fresh water have two pools to choose from. Not into watersports during your nondiving time? How about visiting the pro shop and trying out the five clay and two hard surface tennis courts? The Colonnades Beach Hotel can even arrange special discounts for its guests at two golf courses.

Just down the road from the hotel, Mike Guider's Greenhouse serves up exotic tropical drinks along with a variety of dining, lunching and munching items. The Burt Reynolds Dinner Theater and Musicana Dinner Theater present different theatrical entertainments. If win, place and show figure prominently in your vocabulary, try your luck at Palm Beach Jai Alai or Palm Kennel Club. If you just enjoy spending money at Gucci's or Cartier's, Worth Avenue in Palm Beach has these and other fine stores. The Sailfish Marina on Singer Island hosts several sportfishing tournaments each year; the Palm Beach area is considered a world-class gamefishing ground.

Since Frank's Dive Shop runs two daily dive charters, vacationers can draw up their own schedules. Whether guests arrive for the three day or six day package, visitors will find the staff will try to accommodate the diver's desires as much as possible. Frank can arrange classes in such specialties as wreck, night or deep diving. Some people have come down to make their initial training dives and returned later to enroll in other certification courses. Like the dive trips, Frank's Dive Shop will gladly schedule these programs for individuals as well as couples or groups.

For information contact Frank's Dive Shop, 301 East Blue Heron Boulevard, Riviera Beach, Florida 33404; (800) 848-7632. In Florida call (305) 848-7632.

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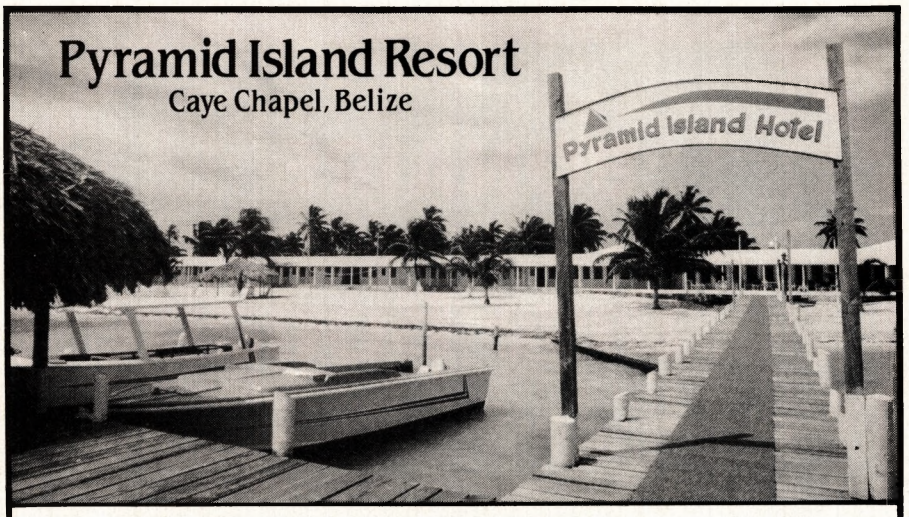
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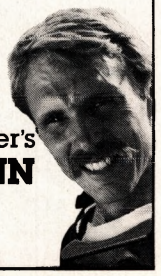
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SEA DWELLERS

(Continued from Page 96)

potential dive sites throughout the National Marine Sanctuary and beyond. The sanctuary also contains the famous Christ of the Abyss statue and the impressive fish filled *Benwood* wreck. A new site, manmade and complementary to the natural surroundings, is the handiwork of artist Ross Nathan Powers. Looking like a spaceage erector set, the huge, stainless steel, underwater sculpture is called No Turning Back. The spiraled maze invites a swim-through and can be entered or exited at any point. This Key Largo Underwater Art Gallery is a short distance from popular Molasses Reef.

Sea Dwellers is a recognized leader in dive services and complementary programs. Years ago they structured a Key Largo weekend that combined a pleasant stay with custom diving and a barbecue chicken cookout. Last year they initiated a certification vacation at the Holiday Inn. A full open water certification can be achieved during a week's stay, moving quickly from the hotel pool to a series of developmental dives off Key Largo.

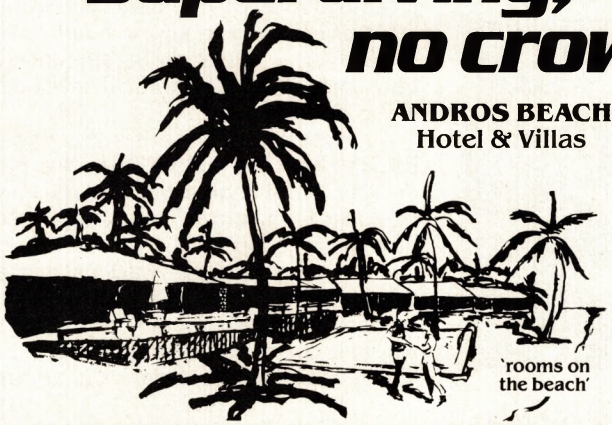
This year a full service photo and video program is underway. Centered around photo pro Steve Finz, Sea Dwellers now offers the full gamut of rentals, instruction and production to tape and film buffs. Finz—who has been with Sea Dwellers since October—is the former general manager of one of South Florida's largest video distributors. Educated in Chicago and at the University of Miami, Finz has eight years in the video business and has moved naturally into underwater video. Visiting divers can get behind the camera or star in their own underwater video productions, utilizing a JVC camera and 20 minute, one-half inch format recorder inside an AquaVideo housing. After the tape is run through a color enhancer it is edited and dubbed with the customer's choice of music. Steve Finz has also produced a 40 minute Florida Keys generic dive video featuring five different sites on the Sea Dwellers agenda. The Keys cassette is available at the dive center or by mail order for $19.95. The photo/video services are available every day.

Combine the friendly, professional staff at Sea Dwellers with the comfort and convenience of the Key Largo Holiday Inn and you have an example of dive packaging at its best. Without leaving the continental U.S. you can experience a variety of tropical treasures.

For a smorgasbord of day/night packages contact Sea Dwellers Dive Center, Mile Marker 100, Overseas Highway, Key Largo, FL 33037 or call (800) 451-3640 toll free. Call (305) 451-3640 in Florida or 245-0333 in Miami.

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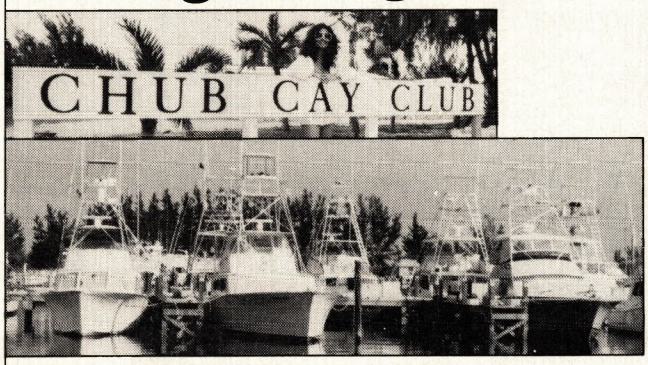
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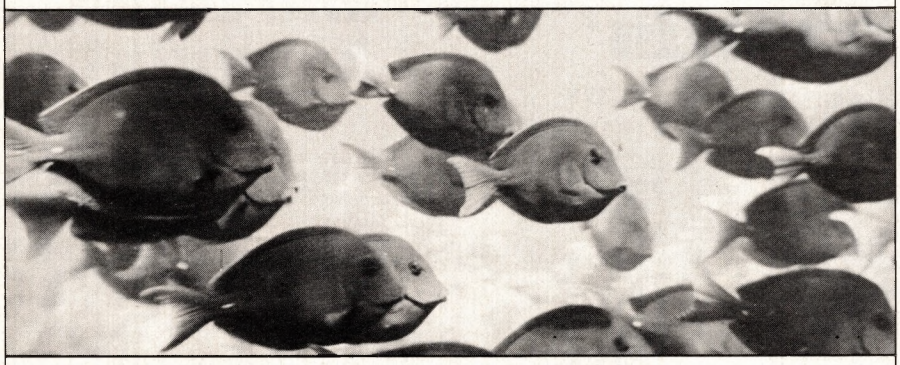
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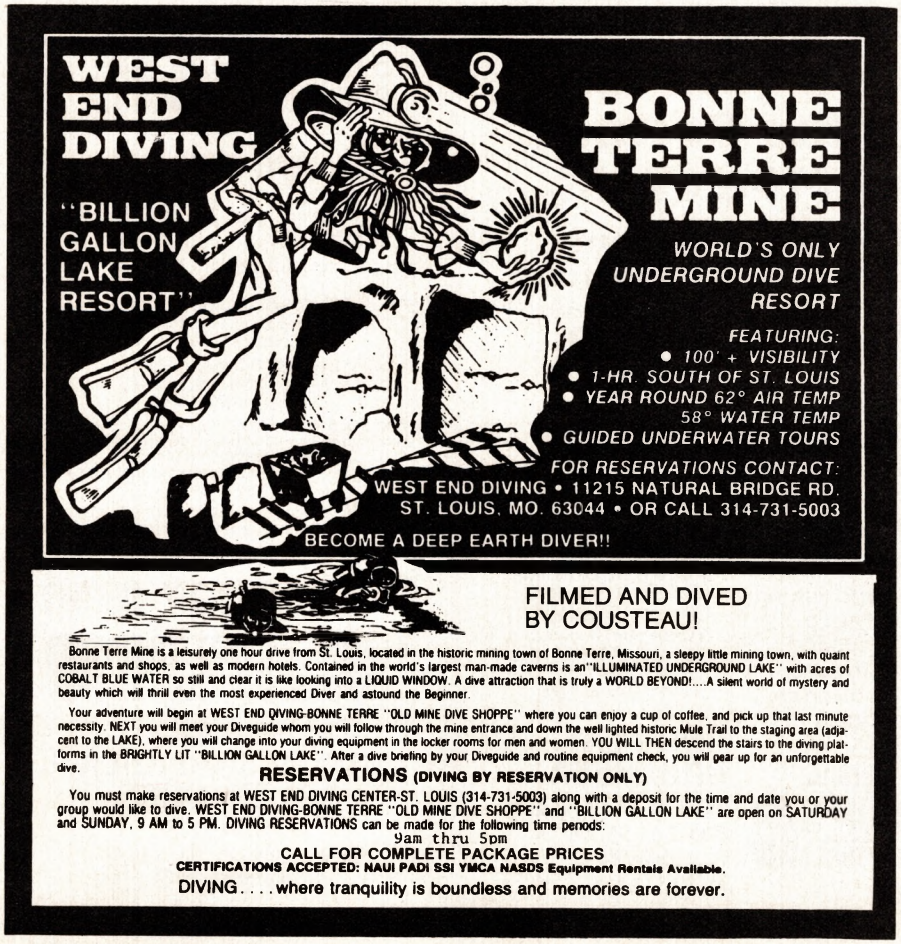
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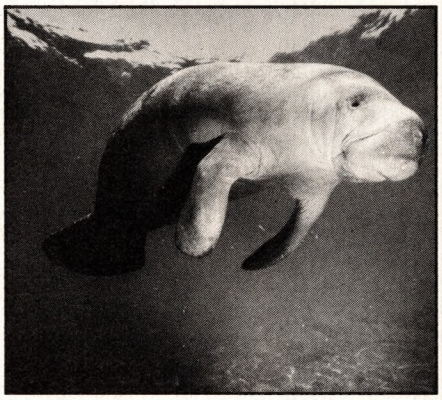
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MANATEE MAGIC

(Continued from Page 105)

ing sides he would roll and turn, obviously enjoying every moment. He would leave us only long enough to return to the surface for air. Other divers approached from time to time but he would have nothing to do with them.

As much as I enjoyed this exchange I couldn't help but wonder where the parent was. At the edge of our visibility, maybe 30 feet or so away, I saw a large manatee pass in and out of view several times. I suspected this was the mother but the animal made no attempt to approach us or the baby so there was no way to know for sure. Our games with the young one continued. Finally, our air supply dwindling, we had to surface and return to the boat for the day.



Manatees can grow to more that 12 feet in length and can weigh more than 1,000 pounds, yet they are extremely graceful as they move slowly through the water.

The next morning those of us who wanted to make one more dive before returning to Columbia met at the dock at 7:00 am. The day before there had been ice on the boat. This morning there was fog so thick it was impossible to see from one end of the boat to the other. We milled around, hoping the fog would lift. It did—some. By 8:00 am we could see some 10 or 15 feet beyond the boat, so we decided to give it a go. Two hours later we arrived at the spring.

We geared up and entered the water. There were more manatees present than the day before but, surprisingly, there were fewer divers trying to get a look at them! In a large clearing in the weeds I spied the baby playing with the same diver he had played with for two days in a row. I cautiously approached to within a few feet, not wanting to disturb either one of them. The baby saw me and I swear there was a look of recognition in his eye. He moved in my direction, nudging me and almost knocking me over. I reached out my hands and, as he had done the day before, he allowed me to scratch

him. For several minutes he went between me and the other diver getting rubbed, scratched and petted.

A large manatee passed over us, maybe 20 feet away. The baby swam toward it and for a moment was out of sight. I thought it probably wouldn't return and swam over to the other diver. At that time, however, the baby returned, rolling us both backward as it swam between us. It was playtime again. The large manatee also returned but wouldn't approach. I was sure now it was the mother of the baby we were playing with. The baby would surface to get air, swim over to the mother and then come back to us. Each time the baby approached the mother she would come a little closer. It was as if the baby was trying to convince its mother to come close enough to be able to enjoy the same affection he was receiving.

At first the passes made by the mother were wide enough to carry her well beyond our view. The more trips the baby made to her, the shorter the passes became until it got to the point she never left our sight. We never let up playing with the baby and it never stopped going over to his mother. At times he actually tried to push her toward us.

Finally, she decided to come in close. Almost shyly she approached my outstretched hands. Just momentarily she touched me and then turned away in a tight circle, keeping her eyes on me the entire time. As she swam back by me I was able to run my hands the entire length of her back. About this same time I felt a bump on my back. Turning, I found the baby had approached me from behind, wanting attention. As I rubbed him, mother came up beside me and lay down on the sand. I reached out with the other hand and began rubbing her also. I was starting to understand I was being allowed to experience something very special, entering a realm that transcends mere man and animal.

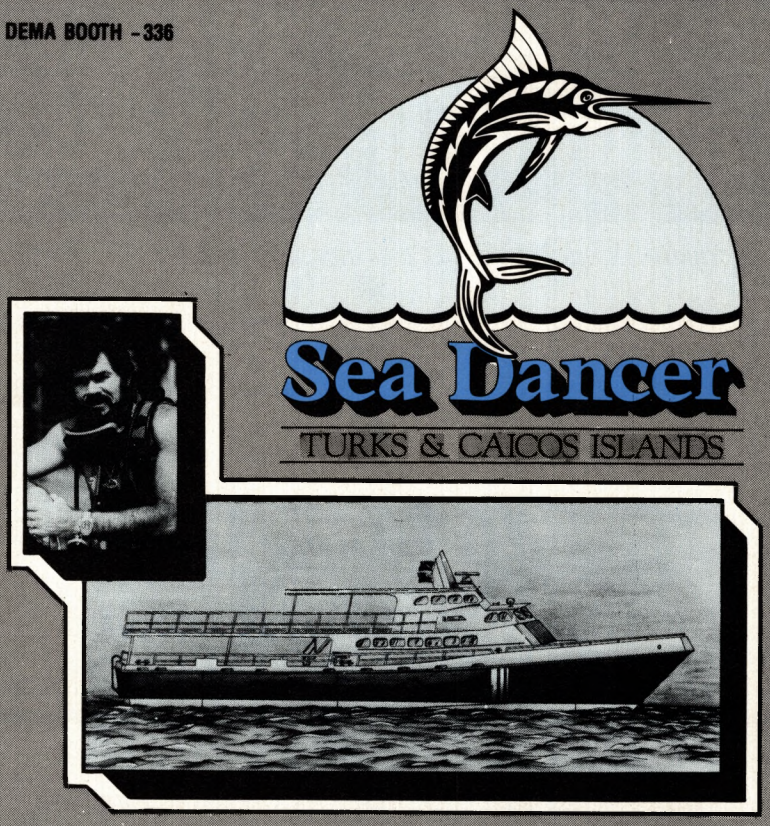
I decided to see what would happen if I made it appear I was leaving. I turned and started to swim off. I had not gone 15 feet when I felt a bump from my left then another from the right. I was being pursued by both animals. I continued on. The bumping became a little harder, then developed into pushing. The baby came up from my right side, nudging me to the left. The mother then came up under my feet and they completely turned me around. I settled to the bottom to revel in my newfound friendship.

There are no words to describe my feelings as I rolled along the bottom with these two animals. They could sense and relate to the basic feeling of trust. Since man is the manatee's worst enemy, this is a monumental accomplishment.

No matter how many more times I travel to Crystal River I doubt I will experience anything such as this again. For me it was a very special moment, a moment to be remembered for the rest of my life. It was a moment of magic.

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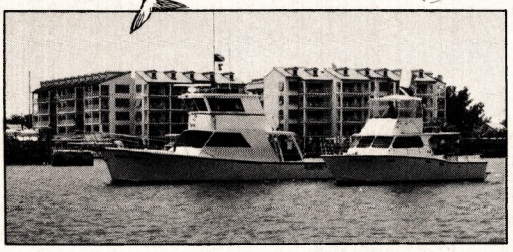
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TECHNIFACTS

(Continued from Page 48)

the possibility of psychological and physiological fatigue developing in personnel who may be required to work in shifts around the clock.

Two meticulous sets of records must be kept. Dive station records include information on diver status, status of all equipment, task description for each diver, and all standard dive log times and notes. Personnel exposure data records must also be maintained showing exposure data logged during a nuclear diving operation. This information is evaluated daily. No diver is allowed to exceed the previously established limits of exposure.

Diving procedures are much more detailed and stringently monitored than is either required or possible in sport diving. At all times the work of the diver is supervised by a divemaster, a radiation technician and a chemical technologist. The customer's project health physicist will also probably be present for some stages of the work and for final exit from the water by the diver. The ultimate goal of the dive plan and execution is zero skin contamination by radioactive water.

EQUIPMENT

It is obviously necessary for the diver to wear a completely dry outfit. In some of their nuclear diving The Ocean Corporation divers use the Advanced Air Hat No. 2000 in conjunction with a heavy duty, shoulder-entry, waterproof zipper-closed suit. Heavy underwear or other insulating garments must usually be worn owing to the increased temperature of the water in the reactor site. The suit should have both boots and gloves attached. The communication system in the helmet and topside must be both clear and extremely reliable.

For additional protection from possible water entry into the suit, heavy rubber work gloves are worn over the gloves of the suit. These are taped onto its arms for watertightness. Heavy rubber boots are worn over the feet of the suit. Conventional weightbelts are worn; the diver must be negatively buoyant.

Each step of the "dress in" and "dress out" procedures are detailed in TOC's Nuclear Diving Safety document. Each of the steps is double-checked and then checklisted and confirmed by at least two surface personnel as the diver is dressed in and out.

DECONTAMINATION

The maintenance of a clean environment inside the diver's dress is important in reducing the possibility of radiological contamination. Post dive activities, particularly, must be methodical to assure no contaminated water enters the dress or

touches the diver. Tenders, telephone talkers, logbook and timekeepers must also be protected. Topside personnel wear special boots, protective pants and lightweight plastic jackets and hoods for protection from splashed water. All personnel wear protective eyeglasses.

One of the potential problems of using tools is their use might puncture the diver's dress. With this in mind some tools are modified to reduce this possibility. Others may be taped or padded. Generally, pneumatically operated tools are preferred for use in radioactive pools. However, they use a large volume of air and may cause so much water surface disturbance that some air pollution may result. To reduce this possibility, pneumatic tools can be vented to the surface.



photo /Larry Cushman

NUCLEAR DIVING

The first large scale commercial nuclear diving job was the reactor snubber shim replacement mentioned previously. The Ocean Corporation accomplished this in 1973. Since then nuclear diving has gained acceptance as a safe and cost-effective means of efficiently performing nuclear plant maintenance work. Larry Cushman told me, "The use of divers can significantly reduce manrem exposures, remote tooling costs and plant down time, because water areas do not have to be drained, expensive remote tooling is not needed and in-plant personnel requirements and exposure levels are not increased." To date TOC nuclear dive teams have been used to solve problems, minimize outage time and save money for the operators of more than 25 U.S. nuclear power plants.

It is interesting to note that many of the skills, some of the equipment and a number of the qualifications required for nuclear diving are the same as those developed and used daily by sport divers. There is certainly no doubt, however, that nuclear diving, in fact, diving in any kind of polluted water, should not be undertaken by anyone who has not received all of the special training required for safe work in such potentially hazardous environments. Diving for sport is a day of fun in the sun. Almost all commercial diving—and certainly nuclear diving—puts stress on a diver that takes all the fun out of the day's activity. Make yours a safe and fun diving day.



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SPLASH '87 PLANNED

After more than 200 divers tested the "fun quotient" of Cozumel during the unique Splash '86, organizer Don Mears of Houston, Texas announced that an expanded version will be offered to divers and dive shops across the U.S. in 1987.

Splash '86 brought divers together from all over the U.S. for five days of diving and dynamic events. There was an underwater photo contest and a spectacular treasure hunt with more than $10,000 in prizes. There was plenty of Texas-style partying including the only male/female bikini contest held annually in diving. (The homemade bikini cannot be constructed of fabric! Entries included tortillas, bubble gum wrappers, aluminum foil and mask and fins!)



photo/Jesse Cancelmo

Houston based Two Worlds Travel is the host for this annual event. According to Don Mears, president of Two Worlds, Splash has had to be expanded each year because nearly "80 percent of the folks attending sign up for next year!" This year should see 800 divers traveling to Cozumel for this special event, held October 11-28.

Arrangements for divers and dive shops (groups are welcome) may be made by contacting: Two Worlds Travel, (800) 446-2166; in Texas (713) 446-2166.

CAYMAN VIDEO

Scuba Safari of Grand Cayman has completed a video entitled *The Cayman Adventure*. It features Cayman's attractions from 800 feet down "the Wall" in a submarine to 200 feet in the air flying on a parasail. Other points of interest include scuba diving and the sea turtle farm.

Scuba Safari is continuing its guesthouse/diving package. This includes one free video plus a 20 percent commission offered to small and medium size groups. Divers having an underwater portrait made can use a DPV free.

For information call Jeff Kingstad at (809) 949-3742 or write Scuba Safari, P.O. Box 2029, Grand Cayman, BWI.

BITTER END DIVING

Bitter End Yacht Club, Virgin Gorda, BVI offers daily diving expeditions with Bert Kilbride aboard his 42 foot dive boat, *Shah*. The daily expedition may be to Anegada to explore the reefs, to one of the many shipwrecks off that island or to another of the 50 dive sites Kilbride has charted and knows well.

Kilbride's dive team is a family affair. Three generations are active in teaching and underwater tours. Treasure hunter Bert is the patriarch of the clan. His son, Gary, serves as PADI instructor and guide and Gary's son Patrick is a NAUI instructor. Between them, the three Kilbrides represent nearly 70 years of diving and more than 30 years of teaching.

In addition to a resort diving course at Bitter End, Kilbride can furnish tanks, backpacks, weights, BCs and regulators if divers require them. For information on special vacation packages or Bitter End rates and reservations, contact The Bitter End Yacht Club, 875 N. Michigan, #3707, Chicago, IL 60611; (312) 944-5855.

SEYCHELLES DIVING/ AFRICAN SAFARI

Tropical Adventures is sponsoring an expedition to the Seychelles in the Indian Ocean. After spending one week diving the Seychelles, the group will fly to Kenya to begin a one week safari, visiting some of Africa's most magnificent wild game reserves. The trip departs in September and is limited to ten people.

For further information contact Tropical Adventures, 170 Denny Way, Seattle, WA 98109; (800) 247-3483 or in Washington (206) 441-3483.

AMERICAN LEISURE/ COZUMEL

American Leisure, a leading Mexico travel wholesaler, has formed a new Underwater Holidays dive tour department serving Cozumel. American Leisure will feature all inclusive dive packages using a selection of different hotels priced from luxury to economy. Packages include hotel accommodations, diving (with unlimited beach diving), airport transfers and Mexico hotel tax. Special air fares have been arranged from cities in conjunction with Continental Airlines, featuring daily service through Houston.

American Leisure's dive operator in Cozumel is Caribbean Divers, which recently moved into a spacious location on the waterfront, tripling its previous size. Caribbean Divers has three dive boats including a 38 foot Delta. A full service operation, Caribbean Divers offers PADI, NAUI, NASDS, YMCA, FFI and CMAS certifications and full equipment rentals.

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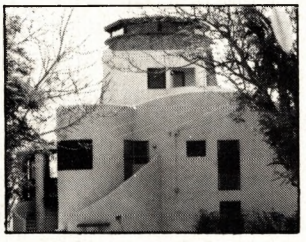
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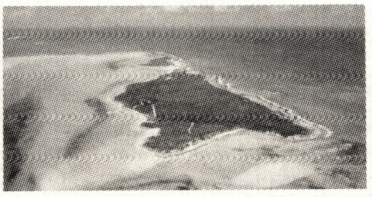
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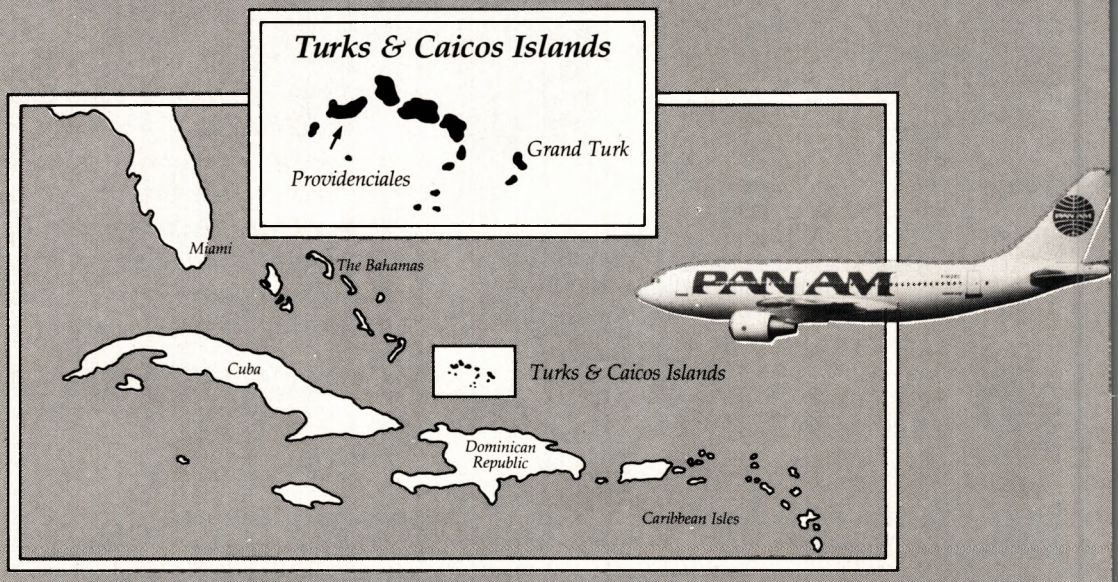
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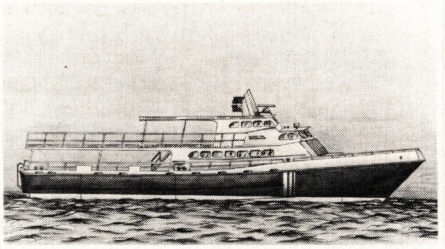
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(three with queen-size beds), *Sea Dancer* allows complete, unlimited diving freedom among the coral reefs surrounding the Turks & Caicos Islands. *Sea Dancer*'s facilities include on board photographic services with E-6 color processing, a boutique and compressors that allow unlimited air fills. She also features alfresco dining above deck and additional watersports, including two 17 foot Zodiacs with 45 hp motors, two sailboards, waterskiing equipment and a selection of deep-sea and bone fishing equipment.

Divi Hotels is the largest independent owner and operator of resort hotels in the Caribbean, with resort facilities on the islands of Aruba, Barbados, Bonaire, Cayman Brac and St. Maarten; Peter Hughes dive operations on the islands of Barbados, Bonaire, Cayman Brac, Curacao and the Turks & Caicos Islands; and casinos in conjunction with their hotels on the islands of Aruba and Bonaire.

Reservations and information can be obtained from recognized travel agents, dive shops or Divi Hotels Marketing, Inc., (607) 277-3484 or toll free (800) 367-3484 in the U.S. and Canada.

GALAPAGO INN FLEET

In order to guarantee the availability of dive boats at all times, the Galapago Inn dive resort in Cozumel has traditionally owned and operated its own vessels. In view of the increasing demand for its services, it recently acquired another custom-made 34 footer, which brings the fleet to five dive boats and several back-up runabouts.

The crew and staff is hired and trained by the resort's management and dive trips depart from the hotel's own pier in front of the dive shop.

For information call (800) 847-5708 or write P.O. Box 810306, Houston, TX 77281.

GYPSY DIVER

Gypsy Diver is an appropriate name for Bob Soto's Diving Ltd.'s newly remodeled 32 foot dive boat. It can carry a maximum of 20 persons but will usually be limited to 15-16. Originally known in Grand Cayman as *Big Ship*, the boat was in service during the past six years with several different dive operators before finally being purchased and completely remodeled by Bob Soto's staff.

Gypsy Diver has a drop front that makes it a natural addition to the six other drop-front boats used at the Seven Mile Beach operation. The eighth boat in the fleet is the V-hull *Paradise Diver*, dedicated to North Wall trips.

For more information on Bob Soto's Diving, Ltd. call toll free (800) 262-7686 or write Bob Soto's Diving Ltd., P.O. Box 1801, Grand Cayman, BWI.

SEA FEVER

Sea Fever Diving Cruises has expanded the activities and services available aboard its live-aboard dive boat. The *Sea Fever* now offers complimentary waterskiing, hydro-sliding and windsurfing. She also has a complete high-tech video system. There is underwater video equipment available on a rental basis, as well as an on board videographer who can tape your vacation above and below the sea. Traveling videographers will be assisted in the use of the ship's on board video and audio editing, duping and use of special effects equipment.

The 90 foot *Sea Fever* offers five to seven day live-aboard dive cruises in the Bahamas and the Cay Sal Banks.

For information call toll free to (800) 443-3837. Florida residents call (305) 531-3483. You can write Sea Fever Diving Cruises, Inc., P.O. Box 39-8276, Miami Beach, Florida 33139-0276.

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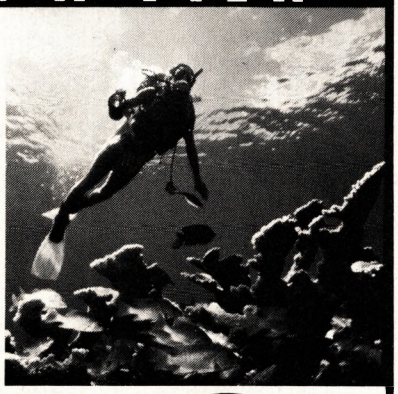
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POSEIDON COMPRESSOR

Rugged Reliability In An Attractive Package

BY JIM WALKER

"Nize li'l ma-shin," said the passerby, as I wheeled Poseidon's Uni air compressor to my truck. "What's it do?" The blank look on his face when I explained told me it made no difference; he just liked its looks. And, what the heck, he was right: It *was* a nize ma-shin!

The Uni (as in universal) portable air compressor is a compact, attractive system. It gave me the impression of rugged reliability at first glance.

The Uni measures only 28 x 13 x 14 inches and weighs between 70 and 90



photos/Bonnie J. Cardone

The Uni air compressor weighs less than 90 pounds and is completely portable.

pounds, depending on the motor utilized. Thus, it's definitely a portable. What's more, it comes with wheels and a handle. And, as an example of the "extras" designed into it, the Uni's tires are pneumatic! They absorb bumps and make maneuvering the compressor quiet and smooth, as well as absorbing vibration when the motor is running. They should also be merciful to boat decks.

The Uni is available with three power sources: 1-phase, 115/220 volt electric motor; 3-phase, 230/440 volt electric motor; and 4-stroke, 3.5 horsepower Honda gas engine. Special voltage motors are available on request. The standard operating pressure is 3,200 psi with a maximum of 4,700 psi. Thus, you can fill your aluminum 80s all the way—not bad for a portable. The compressor output is rated at 2.3 cubic feet per minute

up to a pressure of 2,800 psi. This translates (72÷2.3=31.3 or 80÷2.3=34.8) to about one-half hour to fill a typical tank to that pressure. Of course, filling to higher pressures will take longer.

The Uni tested for this article was powered by the Honda engine. Since it's a four stroke, it required no fuel mixing. Starting was easy and the muffler kept the engine noise down to that of a reasonably quiet lawnmower. The engine was very clean burning—once the choke was off, the exhaust was not visible. The engine never had to labor, even near the end of a 3,000 psi fill. The Honda has several convenience features including graphic, painted-on illustrations for the choke and fuel levers, an easy-pull-off spark plug cap and, what I found most handy, a rotary on/off switch. The fuel tank has a 2.5 liter (5.3 pint) capacity, which will run the engine for about two and one-half hours.

The compressor itself is a three cylinder, three stage device lubricated with synthetic oil. It features two overpressure safety valves, three cooling coils and two condensate release valves. Air is purified several times, beginning with a paper filter at the intake chamber, followed by foam rubber, felt and activated charcoal filters. The compressor should always be run outdoors in an open area. To prevent the engine's exhaust fumes from entering the compressor, a sectioned PVC tube extends upward from the air intake chamber. This "snorkel" can be extended from nine inches to five feet above the machine, depending on the number of tube sections used. As these sections merely slip into one another, the whole snorkel can be quickly broken down and carried in one hand when the compressor is moved.



The Uni has a 5,000 psi fill hose (with gauge) and a PVC snorkel (above compressor).

The Uni comes with a four and one-half foot long fill hose, rated to 5,000 psi. The tank-fill valve features an on/off knob, two bleed knobs and a pressure gauge reading in both psi (5,000 max) and bars.

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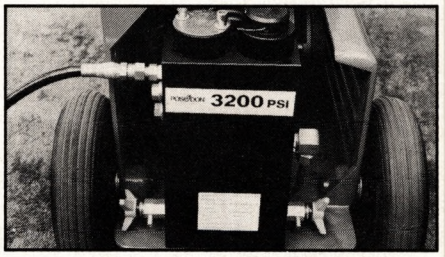
UNI COMPRESSOR

Both the compressor and engine of the Uni are surrounded by heavy gauge aluminum plates, painted bright red. A chrome lifting bar runs across the top of the unit.

The bottom line, when it comes to a portable compressor, is fill time. You don't want to be sitting on the beach all day waiting for enough air to make your dive. And, close to its rating, the Uni filled my aluminum 80 from 500 to 2,500 psi in 34 minutes. This is plenty of air for most dives, and more of a fill than you get on many charter dive boats. I continued filling the tank to 3,000 psi, adding another



The Honda gas engine generates 3.5 hp.



The Uni's operating pressure is 3,200 psi.

18 minutes for a total of 52. This is excellent performance for a portable compressor, however, I'm not sure putting the extra 500 psi in the tank is efficient use of the compressor, fuel or time.

Of equal importance to fill time at a remote site is reliability. Taking into account the excellent engineering reputations of both Honda and Poseidon, plus the smooth, simple operation and sturdy feel of the compressor I tested, I can only assume the Uni will rate highly in this category, too.

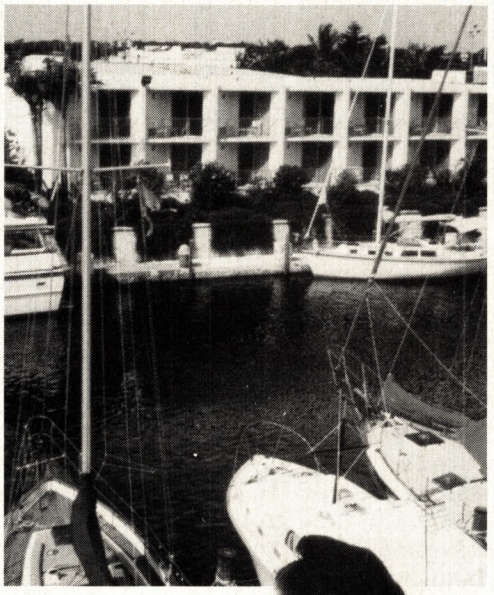
The Uni has a one year warranty on both the engine and compressor. It retails for $2,395, which isn't a bad investment if you do a lot of dive/camping or own your own boat. The Uni is, after all, a nize li'l ma-shin.

The Uni and other Poseidon compressors are distributed on the U.S. West Coast by Leonard L. Bern Specialties, Inc., 17663 Jacquelyn Lane, Huntington Beach, CA 92647; (714) 847-5100 or (714) 842-6539. In the eastern U.S., Poseidon compressors are available through Poseidon Air Systems, 145 Cherry Street, P.O. Box 364, Burlington, VT 05451; toll free (800) 848-4829.

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O'NEIL TO OCEAN QUEST

Bernadette O'Neil has joined Ocean Quest International of Mandeville, Louisiana as vice president of marketing. Ocean Quest is a new corporation that owns and operates a 414 foot cruise vessel that will sail weekly from New Orleans to Mexico and Belize, beginning in April. O'Neil states, "The prime purpose of Ocean Quest is to provide an environment in which divers and nondivers can enjoy a first class vacation together"

The cruise ship will anchor near premier dive sites in Mexico and Belize while offering interesting shore excursions, resort courses and snorkeling for nondivers. All passengers will enjoy cruise amenities, such as gourmet food, nightly entertainment and casino gambling.

O'Neil is responsible for all marketing aspects at Ocean Quest including print, media exposure and industry relations.

For further information on Ocean Quest, please contact O'Neil at (800) 338-DIVE—in Alaska, Hawaii and Louisiana (504) 626-5922.

DIVING SOUTHERN CHINA

See & Sea Travel is offering a touring/diving program to Southern China. Starting from Hong Kong the group will fly to Guilin, where it will spend a day boating down the Li River. Next, the group will fly to Canton, where it will spend two nights at the White Swan Hotel and a full day exploring the city. Then the group will spend several days diving and exploring Hainan Island. After that, the group will return to Hong Kong for a city tour and lunch at the floating restaurant.

The group will be accompanied by an American guide experienced in China travel plus a Chinese guide fluent in English. Trips are scheduled for March 18-April 4, April 15-May 2 and May 13-30. For information contact See & Sea Travel Service, 50 Francisco St., Suite 205, San Francisco, CA 94133; (415) 434-3400 or (800) DIV-XPRT.

DIVE EXPERIENCE VIDEO

Dive Experience has added underwater video services through Aqua Visions of St. Croix. Individual and group videos will be available along with rentals, instruction and sales of Aqua Video housings, Ikelite and Subatec lighting and Panasonic and Sony video equipment. Tapes will be available in VHS, Beta and 8mm formats.

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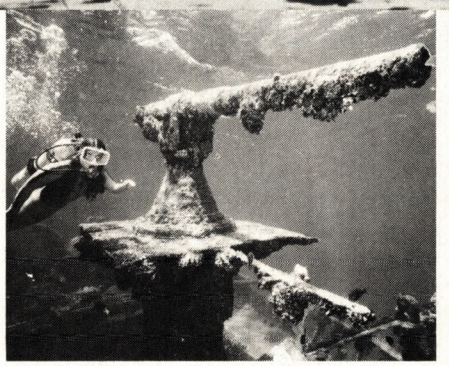
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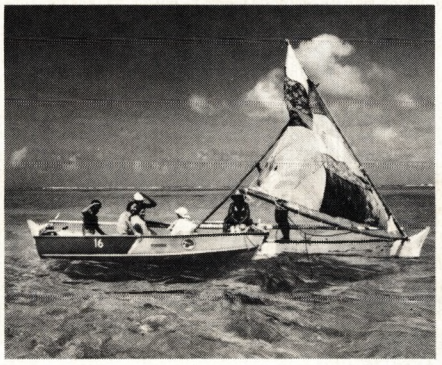
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RSL/HYCO

Research Submersibles Ltd. has acquired 100 percent of Hyco Technologies Corporation (Hytec) of Vancouver, B.C., Canada. Hytec is the major shareholder in the publicly held International Hydrodynamics Company Ltd. (Hyco). At recent meetings in Vancouver, shareholders approved a new board of directors for International Hydrodynamics Company Ltd., as well as a name change. The new name is Hyco Submersibles, Ltd. and new directors include Phyl Nuytten (president of Can Dive Ltd.), Phillip Janca (Chairman of RSL Companies), M. Christine Rosesmyth (RSL director), Christopher "Kip" Woodward (vice-president of Woodward Stores Canada) and J.D. McLean of Vancouver, B.C., Canada.

Hyco and Hytec have relocated to: 126 Garden Avenue, Lions Gate Business Park, North Vancouver, B.C. V7P 3H2; (604) 980-5111.

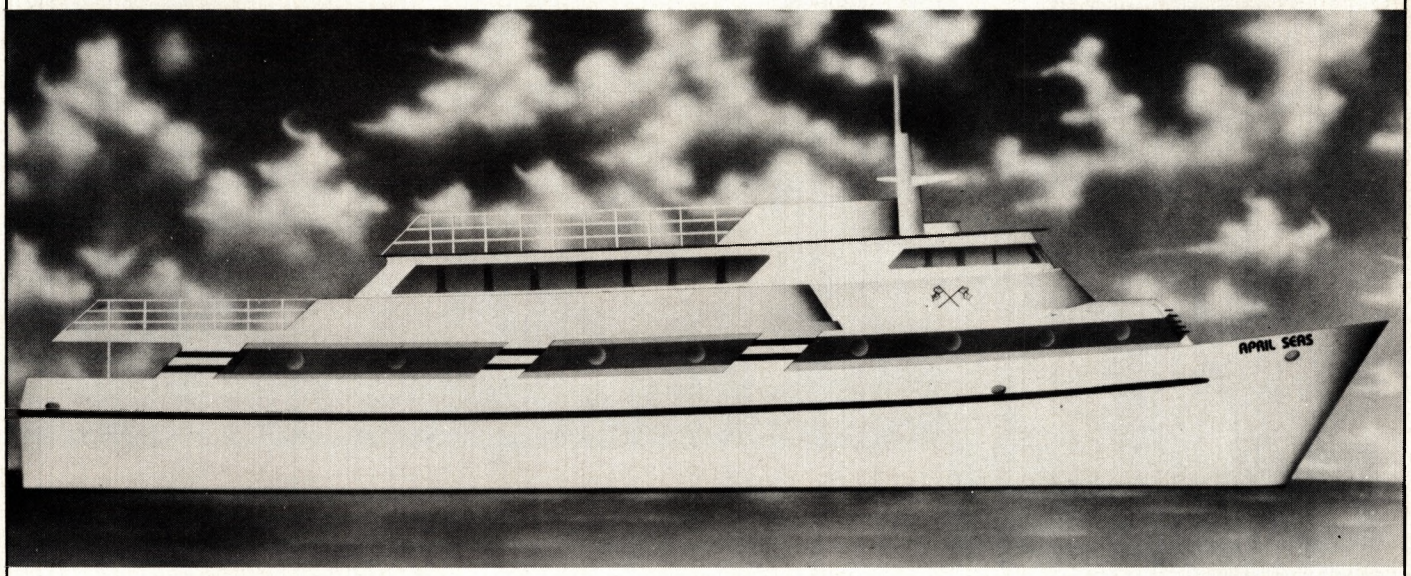
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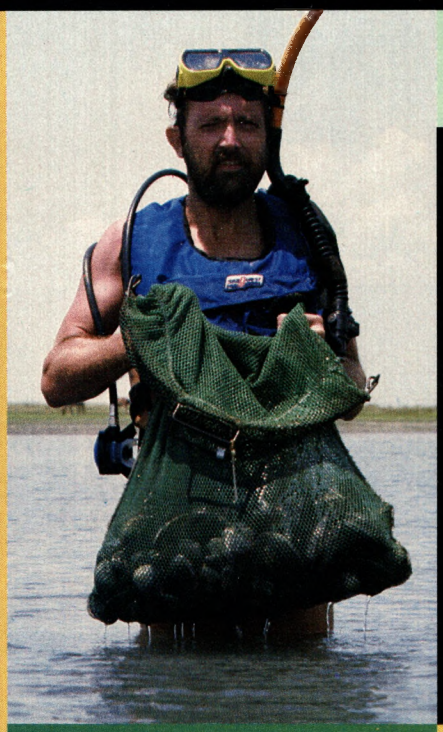
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photos/Bonnie J. Cardone

Bob Cashon surfaces from a clam dive at his secret spot off Beaufort, North Carolina. Quahogs are abundant off the East Coast and can be prepared in an almost infinite number of ways. Above right: Curried Clams.

BY BOB CASHON AND DAN RITTSCHOF

"Around here we don't dive for clams, we rake 'em." This is very likely the response you might get if you ask a Downeaster from eastern North Carolina about good locations for clam diving. This terse response disguises the fact that North Carolina has the largest hard clam (*Mercenaria mercenaria*) industry in the United States. Clams "sighted," raked, "kicked" (washed out by propeller into a trawl net) and dredged from the sounds and estuaries of the Crystal Coast by small time and big time fishermen are found on tables and in restaurants throughout the country, especially during winter months.

Clam diving is a minor sport in North Carolina. In an area widely renowned as a veritable Shangri-La for wreck diving, most sport divers simply ignore the exciting and fruitful possibilities the quahog presents for the diving enthusiast who likes to combine sport with a bit of gastronomic delight. However, we estimate the numbers of clam divers have doubled or tripled in the last year. Clam diving is one of the most relaxing and least destructive ways to bag the daily limit of one bushel and is also one of the few dives that can be made in which the cost of the trip will be covered by the booty for even the slightly experienced diver.

In North Carolina, clam divers often drive or sail to their favorite spot. They choose areas generally not accessible to the other collecting techniques. Particularly fruitful spots are around docks, bridges and pilings. The best areas for diving are inaccessible to the mechanical rigs and too deep for the rakers.

After a pleasant entry through one to three inch surf, the experienced clam diver often finds himself/herself in the clam store—an area paved with clams. The clams are in the top few inches of wrist-deep muck. Gathering is usually performed by feel. Some divers can move slowly over a bed, determining clams of the desired size by their siphons. Divers disturb the sediment only when they remove clams.

Major dangers to the diver are cuts caused by oysters and other shells and broken glass. For this reason, it is wise to wear gloves. The daily non-commercial limit of a bushel of clams weighs more than 60 pounds and should be treated with respect. Becoming overheated by attempting to carry clams while in full gear can be a problem. Plan to exit at a point near a vehicle or float of some sort.

For those of us who don mask and tanks to harvest the bounty of chowders, cherrystones and littlenecks, the rewards are well worth the time. That is, if you can get the clams open. Excited clams can defy even the most powerful human. After collection, allow them to rest quietly for about 30 minutes before gently picking them up and sliding your clam knife between their valves. Gourmets allow the clams to rest on ice. In a pinch, clams

CURRIED CLAMS

25 small or 5 large clams, chopped fine
2 T butter
3 T flour
½ C clam juice
½ C cream or sour cream
½ teaspoon curry powder
Dash Tabasco, salt and pepper
3 T sherry wine
½ tsp. parsley, minced
Rice, cooked

Mix cream with curry powder. Melt butter in top of double boiler. Blend in flour and add clam juice, then stir until creamy. Add minced clams and heat well. Add the cream and curry powder mixture and heat thoroughly, stirring constantly. Just before serving, add the sherry wine and pile over mounds of boiled rice. Sprinkle with parsley.

CLAMS CASINO

6-12 medium clams (per person)
¼ lb. butter, melted
3 garlic cloves, crushed
1 tsp. lemon juice
1 T parsley, chopped
2 T chives, chopped
Bacon

Mix melted butter, garlic cloves, lemon juice, parsley and chives. Set aside for several hours. Open clams, place one teaspoon of sauce onto each and cover with bacon. Broil about five minutes or until bacon crisps.



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CRYSTAL COAST CLAMS

can be rested in very warm water for about five minutes and then opened easily. Pearls are fairly common in larger clams from some areas and can be painful or break teeth if not removed.

If you get tired of "shucking and sucking," clams casino, fritters, chowder or any of the more standard clam recipes, try the gourmet recipe above from Chef Robert of Cafe Annie in Houston, Texas. If you can't get the genuine *Mercenaria*, most other clams will do.

STEAMED CLAMS CAFE ANNIE

32 to 40 littleneck clams
4 C fish stock (see below)—water plus a little wine may be substituted
2 jalapeño chilies
2 serrano chilies
2 red chilies or substitute one red bell pepper
2 poblano chilies
2 large bunches of cilantro, chopped
1 lime (the juice of)
8 oz. butter (unsalted) cut into small cubes
Salt and pepper to taste
1 tsp. garlic, chopped

Fish Stock Ingredients
2 lbs. fish bones
4 C water
1 large carrot
2-3 stalks celery
1 small white onion
1-2 T butter or oil

In a large pot, heat the butter. Add the bones and lightly sauté them but do not brown. Add the vegetables (roughly chopped) and sauté for a few minutes. Add the water and bring to a boil. Skim off any film that may rise to the surface. Lower the heat and simmer for 30 to 45 minutes. Strain the stock. Herbs, white wine or dry spices (cloves, peppercorns, etc.) may also be added.

In a large pot with a tightly fitting cover, put the fish stock, chilies (roughly chopped), garlic and clams. Over high heat, bring the liquid to a boil and steam the clams until the shells begin to open (approximately five minutes after the liquid comes to a boil). Remove the clams to deep soup bowls. Bring the broth back to a strong boil. Add the cilantro, the lime juice and the butter. Allow the broth to boil for a few more minutes (the butter should emulsify with the broth). Pour the broth over the clams.

A good accompaniment for the clams is some fresh pasta cooked in water and then tossed with room temperature butter. After the clams are eaten, the diner can add the pasta to the clam broth.

WRECK FACTS

(Continued from Page 14)

Guide to the Shipwrecks of Thunder Bay. The 77 page paperback accounts for more than 60 wrecks, many within the Alpena, Michigan Underwater Preserve. The author lists facts about each ship, its size, location and references for further study. The book contains more than 25 photos of vessels before they sank. Loran coordinates are listed for many of the wrecks. Stonehouse has written five other books on Great Lakes losses and is a consultant on the lore of the lakes. His Thunder Bay book may be ordered from B and L Watery World, P.O. Box 423, Alpena, MI 49707 for $5 plus $1.50 postage and handling.

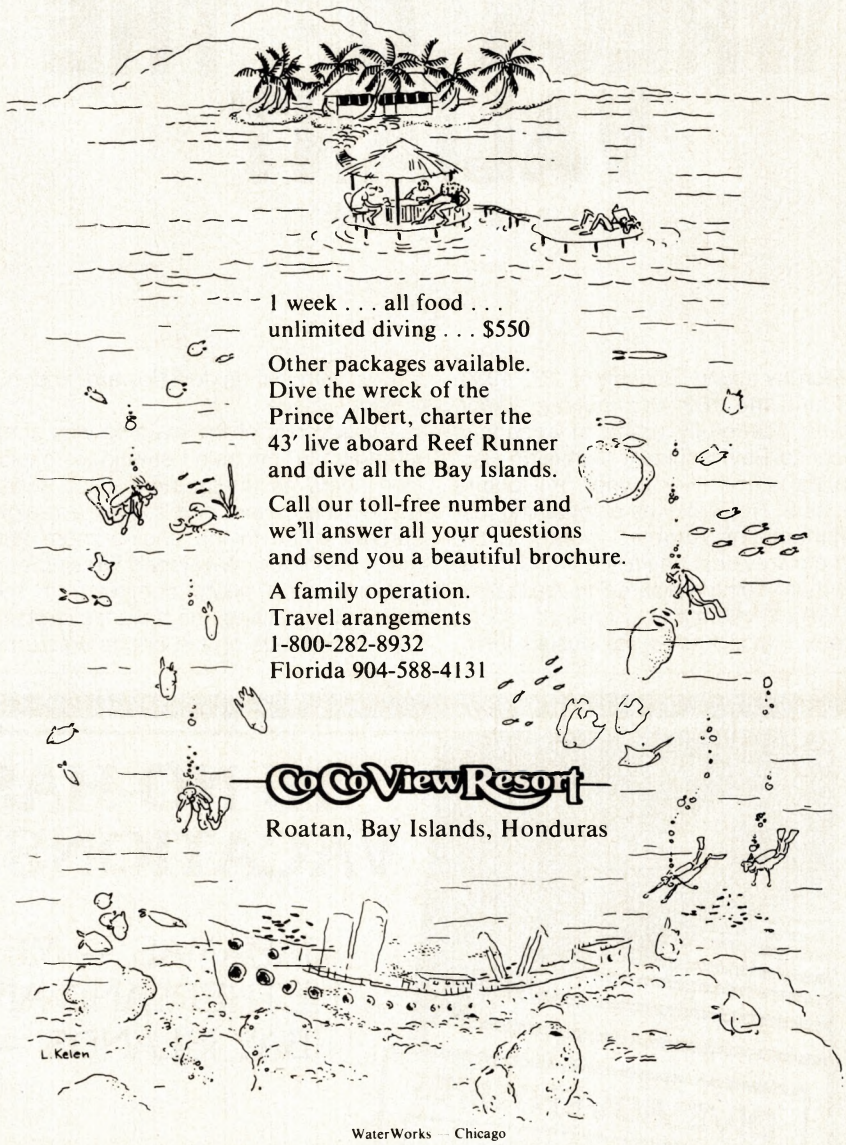
Mike Sheen, College Park, Maryland recovered the ship's bell from the Russian wreck, *Ashkhabad*, sunk off North Carolina. Scott Calardo helped Mike pry it from beneath a steel beam and out of the sand with a crowbar. The bell is inscribed in Cyrillic letters with the name Chelyuskinets, something the divers find very puzzling. Chelyuskinets is a cape in north Soviet Asia, named after the explorer who discovered it. Jim Kiley found a light fixture with its glass case intact, a brass switch box and part of a winch from the wreck of the *Caribsea*. Jim Sears recovered an ornate valve assembly and Bill Fairer brought up a brass electrical box from the *Hutton*. These divers are all members of the Dynamo dive club and frequently visit North Carolina's Graveyard of the Atlantic.

Many North Carolina divers are reading Jim Bunch's new book, *Diving the U-85*. Sunk in 110 feet of water, the *U-85* was the first U-boat sunk in World War II by a U.S. Navy destroyer. The USS *Roper* caught the sub on the surface in April 1942 and sank it with little opposition from the German crew. Bunch has documented the entire story, including many photos of the *U-85* before and after its demise. Underwater shots show every phase of a dive on the coral covered hulk that terrorized U.S. shipping in the early days of World War II. Copies of the 80 page paperback may be obtained by writing to Jim Bunch, Deep Sea Press, P.O. Box 48, Kitty Hawk, North Carolina 27949; the price is $9.95 plus $2 postage and handling.

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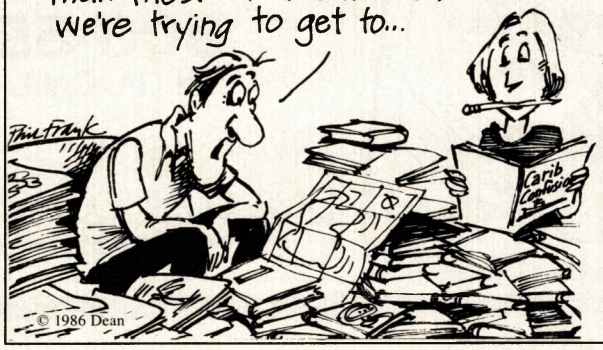
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WRECK OF THE VALIANT

BY STEVE GILES



photo/Bonnie J. Cardone

Above left: After burning for three days, the 163 foot luxury yacht *Valiant* sank in Descanso Bay, just off California's Catalina Island. Above: California Wreck Diver Bill Wilson inspects the bow of the shipwreck. She has been salvaged extensively.

Saturday night, December 13, 1930, found the 163 foot, palatial yacht, *Valiant*, peacefully riding at anchor in Descanso Bay, adjacent to Avalon Bay, Catalina Island. Her owner, millionaire Charles S. Howard, was entertaining four prominent Los Angeles guests in the main dining saloon, awaiting the extravagant meal being prepared in the galley. The *Valiant*'s 20 member crew of sailors, waiters, maids and valets busied themselves with caring for Howard and his floating palace.

The serenity of the evening was shattered at 7:50 pm as a tremendous explosion heard as far as three miles away, rocked the *Valiant* and started a rapidly spreading fire in the engine room and galley. Darkness enveloped the ship and screams were heard coming from the galley. T.J. Vatland, the *Valiant*'s captain, lay unconscious on the bridge where he

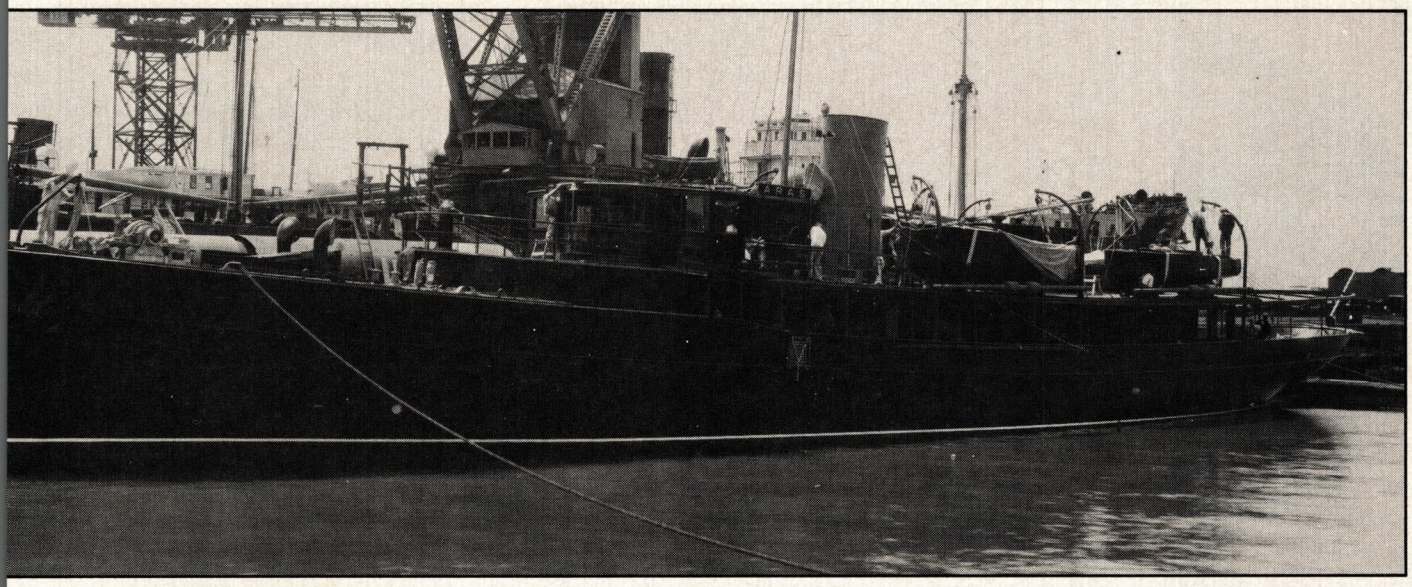


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photo/courtesy Bill Wilson

Launched in 1926, the *Valiant* was originally christened the *Aras*. Powered by two 950 hp diesels, she could cruise at 18 knots.

had been struck by a flying door blasted from its hinges by the explosion.

Both crew and guests struggled to reach the upper deck where they discovered a wall of flames blocking their escape to the gangway amidship. Howard quickly led them forward where two small boats hung swinging in their davits and lowered them all safely to a motor launch waiting alongside the stricken vessel.

All Avalon was awake. Small boats converged on the fiercely burning ship and picked up several members of the *Valiant*'s crew, some of whom had dived into the bay with their clothing on fire. One by one they were pulled from the icy waters, shivering and exhausted.

A second explosion lit the sky and sent debris from the wheelhouse flying through the night air, along with a flaming dinghy from the boat deck. The surface of the dark water was peppered for 100 feet in all directions with burning pieces of the once beautiful yacht.

With his guests safely away, Howard returned to the smoke-filled galley where he was shocked to find Hugo Pebulay, the ship's Filipino baker, trapped in the wreckage, his clothing on fire. Howard managed to drag the screaming baker from the galley to safety, burning his hands severely in the process. As soon as Pebulay was lowered to a waiting

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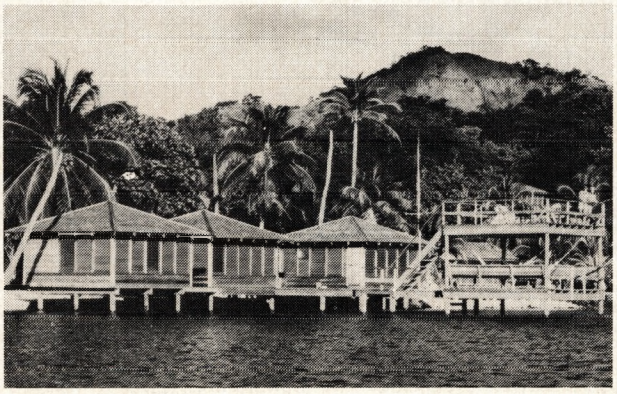
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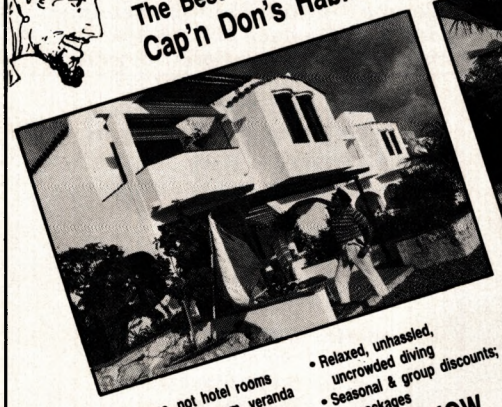
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boat, Howard himself abandoned the doomed vessel, the last man to leave. With his departure, all passengers and crew were safe, the only injuries being mainly shock and burns.

Francis McGrath, Avalon's harbormaster, realized the immense danger to the other craft moored near the *Valiant* and turned the wheel of his launch over to one of the rescued seamen. Pulling in close under the *Valiant*'s steaming bow, McGrath caught up her mooring line and attached a heavy manila line from his launch. Cutting the other end off the mooring line, he rammed the launch's throttle all out and slowly began towing the *Valiant*'s 444 tons of red hot steel out to sea. McGrath's attempt was brave, but futile: Only a few minutes after beginning the tow, the *Valiant*'s port anchor lashing burned through and one and one-half tons of chain started rattling through the hawse. A third explosion shook the hull as the *Valiant* swung around by the head. McGrath realized the *Valiant* would not be moved and parted the tow line. As he headed for the safety of shore, the fire behind him illuminated the bay.

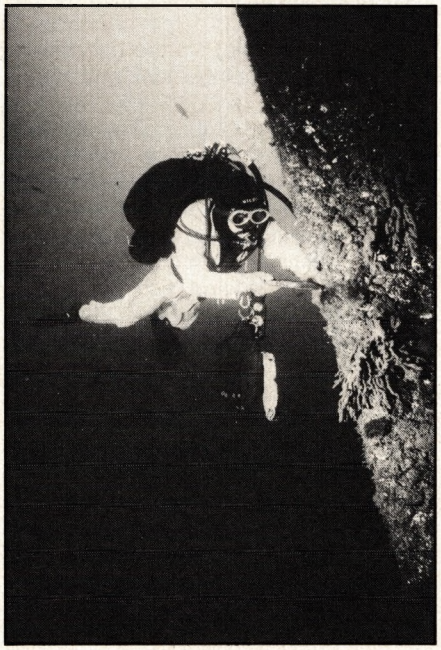
On December 17 the fire had died away, leaving the burned and blackened hull of the *Valiant* riding low in the water. As her riveted steel hull plates cooled, they shrank and separated, leaving hundreds of openings. The hull filled rapidly with sea water and the gracefully curved stern dipped closer to the surface. At 8:10 am she quietly gave up the fight and slipped, stern first, to the white sand bottom of Descanso Bay nearly 110 feet below. McGrath and two helpers barely escaped the suction of her sinking when she went down as they attempted a second tow.

The *Valiant* was part of a record launching at the Newport News Shipbuilding and dry Dock Company on March 20, 1926. Owned by millionaire Hugh J. Chisholm, she was christened *Aras*, his wife's name spelled backward. Powered by two 950 hp Winton-Diesel engines, the *Aras* had a cruising range of 5,500 miles and a top speed of 18 knots. Her length of 163 feet made her one of the largest and most luxurious privately owned yachts under American registry. One unique feature of the *Aras* was her double bottom. It was the first installed in a luxury yacht for storage of fuel, water and for giving her better stability and safety at sea.

Charles S. Howard purchased the *Aras* in 1926 from Chisholm and changed the name to the *Valiant*. Mr. and Mrs. Howard had the *Valiant* brought through the Panama Canal to the West Coast. Just prior to December 1930, they had spent four festive months cruising Mexico, Central America and the South Pacific before reentering the United States at Los Angeles

to restock their fuel and food stores in preparation for returning to their home in San Francisco.

On December 12 the Howards had sailed for Catalina Island with four important guests from Los Angeles for a relaxing stay at the popular bay of Avalon. Their guests, Mr. and Mrs. Earnest Wilkes and Mr. and Mrs. Paul Franklin, were wined and dined aboard the *Valiant* with uniformed waiters catering to their every need. Popular melodies of the '20s drifted from the dance floor at the stern on the main deck and Howard passed out personalized brass tokens to his guests inscribed "Good For One Drink" on one side and "Yacht *Valiant*" on the other . . . that could be used for free drinks in Avalon's many clubs and bars and would be redeemed later as pre-arranged by Howard. In the dining saloon that evening solid silver flatware, each



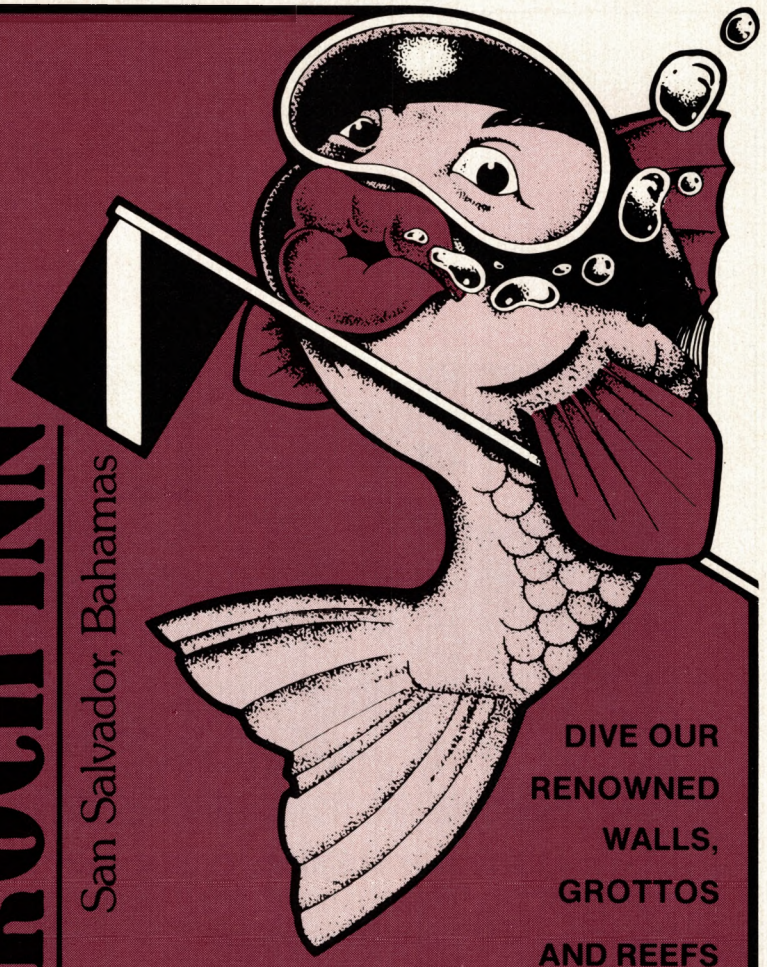
After 46 years beneath the sea, the hull of the *Valiant* is covered with marine life.

piece graced with a silver H on the stem, was carefully set out. The entire vessel was furnished with only the best materials available, from the deep, rich carpets to the brass and crystal lamps that lit the luxurious rooms. Paintings of mountain ranges hung on the teak and butternut paneling and the ship's heart, the commissioning plaque, was solid gold! The *Valiant* was truly a floating palace, a symbol of a bygone era.

Many theories as to what caused the explosion were given at the time of the disaster in various newspapers, but according to later research and interviews with surviving crew members the fault seems to lie with human error.

After purchasing the *Valiant* from Chisholm, Howard was annoyed with the constant throbbing of her diesel-driven generators while at anchor. Howard, owner of the Howard Motor Company,

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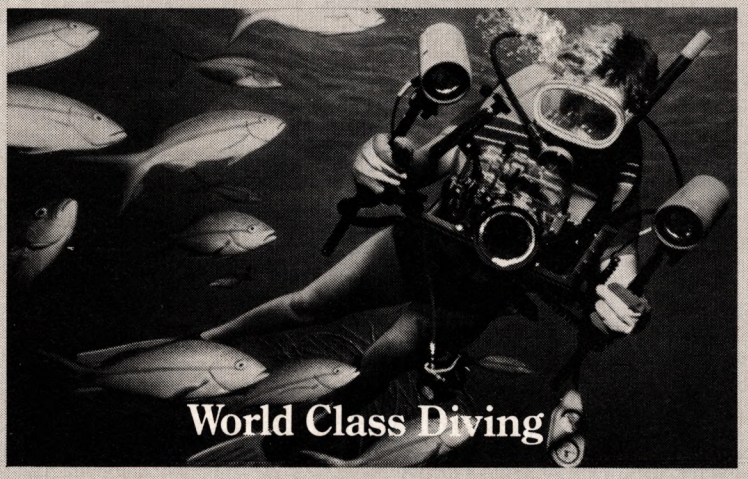
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VALIANT

Buick distributors for the West Coast, found himself in a unique position and ordered a Buick gas engine and an additional generator to be installed aboard the *Valiant*. It turned out to be much quieter and Howard was so pleased that it was used almost exclusively whenever the ship was at anchor.

On the night of December 13 no one was on duty in the engine room when unexpectedly the Buick engine ran out of gas, shutting off power to the vessel and throwing her into darkness. The crew members had been in the midst of a spirited card game in their quarters forward when the lights went out and one of them immediately grabbed a flashlight and ran cursing through the black passageways back to the engine room to rectify the embarrassing problem. Upon arriving he opened a valve that started gas flowing by gravity into a smaller tank and restarted the Buick engine, thereby restoring lights and power. As it required awhile to fill the tank, he decided he had enough time to return to what must have been a hot hand and went back to the card game forward—leaving the engine room once again unattended. A short time later the small tank overflowed and the volatile gas spilled on the engine room floor. It was eventually ignited by a spark, possibly from the commutator on the generator. The explosion cracked not only the forward engine room bulkhead, but the galley floor above and started the intense fire that doomed the beautiful ship.

When the *Valiant* plunged to the bottom in 1930 she took with her more than $67,000 in diamonds owned by Mrs. Howard, along with the personal possessions of the Howards, their guests and crew—not to mention the boat's luxurious accommodations and fittings.

Only two salvage attempts were ever made. One was around 1932 and the divers, encumbered by their heavy hardhat diving gear, described the search as hopeless because of the twisted wreckage and debris filling the hull.

The second and last attempt at salvage was in 1957 and was only slightly more successful. A colorful diver by the name of Bob Bell spent four months removing the superstructure in a search for the missing diamonds, as well as 30 tons of lead ballast. More than seven tons of brass and bronze were recovered, some of it melted into exotic shapes, but no diamonds or lead were found. A few of Howard's tokens were found, still boasting a "Free Drink," but divers could not penetrate the 14 feet of debris and shells lying within her hull in time to make the venture profitable. One of the massive propellers was salvaged around this time. While the event itself is not that unique, the person who salvaged the prop is. It was none other than Mel Fish-

er, now a millionaire treasure salvor in Florida. At the time the prop was salvaged he ran Mel's Aqua Shop in Redondo Beach. The *Valiant*'s gold commissioning plaque was recovered in 1967 by a diver named Bill Stach, who had been on Bob Bell's salvage attempt in 1957—when nothing of "value" was found!

Since those days many sport divers have visited the *Valiant* in her final resting place in the clear waters of Catalina Island. Visits are limited to less than 25 minutes owing to the 80 to 90 foot depth inside her open hull. While the *Valiant* is generally considered a "picked-over" wreck because her ports and other obvious prizes have long since been recovered, digging about inside her hull can often produce interesting souvenirs. Many times the *Valiant*'s history is brought back to life through them.

For instance, some artifacts found in the last ten years include more brass tokens, delicate silverware with Howard's initial on the stem and a collection of 1920 coins, found in the crew's quarters from Mexico, Central America and Panama. Also found in the crew's quarters were several pocket and wrist watches, brass cap and uniform buttons, a high school belt buckle, a gold wedding ring, silverware from Chisholm's days marked "Aras" and a copper key tag inscribed "Aras garage, St. Francis Yacht Club."

Other artifacts speak for themselves of the ship's opulent accommodations: egg shaped brass door knobs, solid nickel cooking pots, elegant coat hooks, several Chelsea ship's clocks (one, from the bridge area, is melted) and pieces from the many beautiful lamps on board.

Some of the most interesting artifacts, however, have come from Howard's staterooms near the stern. Found there was a personal brass shaving kit made by Auto-Strop Safety Razor Co. of NY, a silver belt buckle with the ever present H, gimble mounted brass thermos bottles, .32 and .38 caliber pistols, an inscription tag that once graced a painting called Mountain Tops and best of all, a silver case that was thought to be a cigarette case. After careful cleaning many glass tubes and needles were found inside—and on the outside was inscribed Mulford Hypo Unit. It was a diabetic's silver insulin kit. Whether used for insulin or not, it will forever remain a mystery of the lost and roaring '20s!

For the nostalgic minded, the Buick engine that indirectly caused the sinking of this time capsule still rests near the now silent diesels.

No one has ever reported finding the $67,000 (plus inflation since 1930) in diamonds, but there are still many feet of debris and shells left in the huge hull of the rusting vessel.

A visit to the *Valiant* is like a step back in time, to a different era that will never be again. If you are lucky you just might find a small piece of that history as well—you might even get a free drink!

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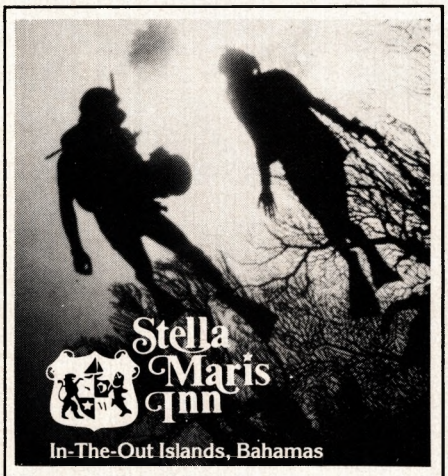
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SEA OTTER VS. FISHERMEN

Hotly Contested Calif. Controversy Rages On

TEXT AND PHOTOGRAPHY BY STEVEN ROSENBERG

California has become the site of one of the most hotly contested political/environmental controversies in recent times. The issues revolve around the stability and vulnerability of the sea otter population in California, as well as the effect the otters' substantial appetite for shellfish has upon the commercial fisheries and sport diving industry.

Prior to the emergence of the fur trade, the otters' range extended from Baja, California to Alaska and along the Aleutian Islands chain to Siberia and Japan. Sea otters in California, which once numbered an estimated 16,000 to 18,000, were hunted nearly to extinction by the early 20th century. In 1938, it was publicly reported that a raft of 50 or more otters was sighted off Point Sur in Central California. The estimated population of 300 sea otters, thought to exist at that time, expanded slowly to an estimated 1,500 to 1,700 animals along the Central California coast by the mid-1970s.

In 1972, the Marine Mammal Protection Act (MMPA) was passed, transferring the responsibility for the California sea otters from the State of California to the United States Fish and Wildlife Service (FWS). In 1977, the U.S. Fish and Wildlife Service designated the population of sea otters in California as a "threatened species" under the Endangered Species Act (ESA) and as "depleted" under the Marine Mammal Protection Act (MMPA). In the process of making this ruling, it also made a finding, based on a 1904 study using one skull sample, that the otters in California were a distinct subspecies—different from those found in Alaska—designated *Enhydra lutris nereis* or the southern sea otter.

Under the ESA, listing the southern sea otter as threatened requires the U.S. Fish and Wildlife Service to adopt a recovery plan for its population. This was done in 1982. It purportedly identified the re-



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search and management necessary to implement recovery of the otter population to such levels that would allow them to be removed from the threatened species list. The language of the MMPA required the FWS restore the otter population to its "optimum sustainable population" or OSP.

The recovery plan drafted by the FWS states the following:

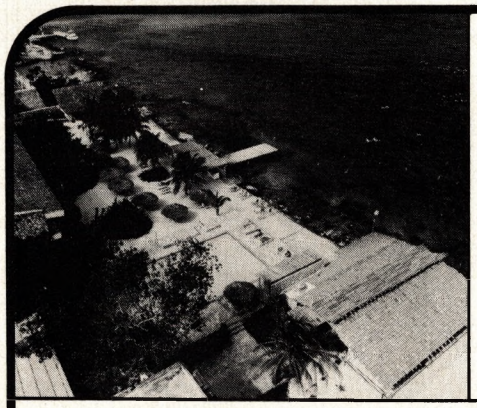
"Delisting should be considered when the southern sea otter population is stable or increasing at sustainable rates in a large enough area of their original habitat that only a small proportion would be decimated by any single natural or man-caused catastrophe. To reach this point: 1) at least one additional population of sea otters must be established outside the current population range, 2) the existing population of sea otters and its habitat must be protected, and 3) the threat from oil spills or other major environmental changes must be minimized."

Thus, the FWS decided the appropriate action was the translocation and maintenance of an "experimental population of southern sea otters." The translocation would involve the capture and removal of a certain number of sea otters from Central California and the release, containment and study of these otters at an alternate site within the original range. FWS came up with four translocation sites: San Nicolas Island, Northern California, Southern Oregon and Northern Washington. San Nick was the preferred site and with the University of California at Santa Cruz, the FWS put together a Draft Environmental Impact Statement on the proposed translocation. The DEIS lists six alternative actions to be taken:



Despite their adorable antics, sea otters are the subject of controversy in California.

1. Translocation to and containment within the vicinity of San Nicolas (the stated FWS preference).
2. Translocation and containment within the vicinity of Northern California.
3. Translocation to and containment within the vicinity of Southern Oregon.



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4. Translocation in conjunction with prevention of range expansion south of Point Conception.
5. Increased protection to the present sea otter population to reduce the threat of oil spills.
6. No action.

FRIENDS OF THE SEA OTTER

On one side of the controversy, Friends of the Sea Otter (FSO) supports the translocation of a number of the sea otters in California to San Nick in Southern California to establish a second breeding colony. They have taken the position that the existing population of otters in California is a unique subspecies. They contend this unique population is continually menaced by potentially disastrous oil spills and accidental drownings in fishing nets. FSO points out the sea otter is vulnerable to oil spills because it lacks an insulating layer of blubber present in most marine mammals and therefore must rely largely on its thick fur to keep it warm in ocean waters. Contact with oil mats the fur and allows cold water to penetrate to the skin, presenting the possibility the otter could chill and die within hours.

According to this group, the best site for the translocation is San Nick because of its isolation and purported insignificant importance to shellfisheries and recreational users. FSO also contends that because of San Nicolas' natural isolation, any emigration by the second population of otters would be discouraged. Further, the group is quick to point out any otters found below Point Conception, which were not in the nearshore habitat at San Nicolas Island, would simply be captured and returned to one of the two populations under the containment provisions of the translocation plan.

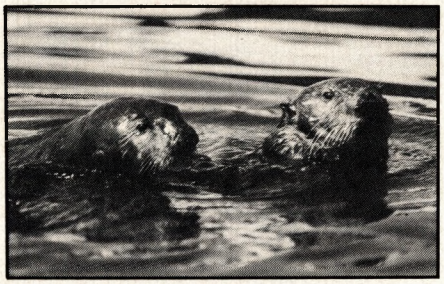
SAVE OUR SHELLFISH

On the extreme other side of the controversy, Save our Shellfish (SOS) and other groups representing the commercial fisheries and part of the recreational sport diving industry argue that (1) the population of sea otters in California should not be on the threatened list because these otters are the same species as the Alaskan otters, which now number in excess of 160,000, and (2) not only should there not be a translocation to San Nicolas, but that a reasonable management policy should be adopted that contains the otter population at its present location and limits that population to its current size.

This group believes that within the current range of the sea otters in California, the population is at equilibrium or carrying capacity, with the birth rate at least equal to the death rate. "There is no scientific paper to support the contention that an oil spill would pose a threat to a

significant section of the existing population of sea otters in California," states Bruce Steele, a representative of SOS. "Thus, there is no reason for a translocation." He adds that according to a study offered by the FWS, an oil spill would present a substantially higher risk to any otters translocated to San Nick than to otters in their present location.

SOS strongly disputes the claim that translocated otters would be likely to remain at San Nicolas. They back up this argument with recent studies that made use of radio-collared otters. The results indicated otter populations at carrying capacity have moved across wide stretches of open ocean to recolonize new, food-rich areas and even females with and without pups crossed such areas. They point out there is no feasible nor practical known method of containment of an otter population that has reached carrying capacity, other than by birth control or removal of otters from that population. Even these methods wouldn't prevent a spread



Sea otters consume nearly 25 percent of their body weight in shellfish each day.

of the population to other islands.

SOS and recreational sport diving interests in Southern California point out a translocation to San Nick—and thereby to the other Channel Islands—would be a disastrous blow. The otters' appetites would soon indiscriminately wipe out the effective breeding populations of abalone, lobster and urchins, thereby economically ruining the shellfisheries in the Channel Islands and adversely affecting the extensive sport diving industry based there. Otters, which eat 25 percent of their body weight every day, prefer food items such as abalone, crabs, urchins and clams.

It is contended that the sport and commercial fishery values for San Nicolas have been grossly underestimated and understated by the Fish and Wildlife Service and Friends of the Sea Otter. The DEIS mentions a combined annual loss to the commercial fishery and sport diving industry of less than $200,000. In reality, the loss would be much greater. Roy Hauser, co-owner of the Truth Aquatics dive boat fleet in Santa Barbara, conducted a telephone survey and found that in 1985, 13 charter dive vessels visited San Nicolas Island and grossed a combined $624,000 in fees alone. In addition, the loss to the commercial fishery should easily exceed $1 million per year.

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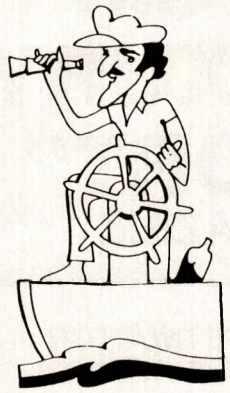
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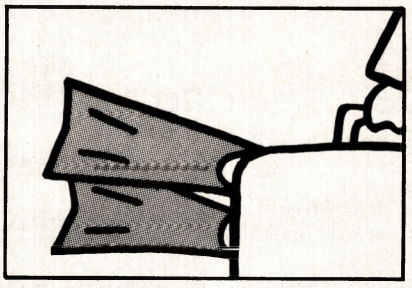
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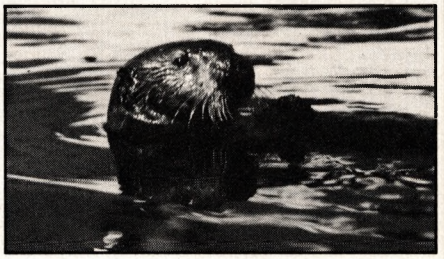
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SEA OTTER

COMMENTS AND ANALYSIS

The claim that the sea otter population in California was a separate subspecies was based on the examination of a single otter skull at the beginning of this century. Dr. Aryan Roest of Cal Poly at San Luis Obispo recently conducted a study of more than 250 otter skulls and refuted the existence of the *nereis* subspecies. One of the most respected otter researchers, Dr. Karl Kenyon of the United States Fish and Wildlife Service, concurs with the conclusions of Dr. Roest's recent scientific research: There is no distinct southern sea otter. The importance of the rejection of the subspecies distinction is that the FWS should first take a closer look at the necessity of this new breeding population before it gets involved with selecting a site for the translocation.

The letter from the United States Fish and Wildlife Service accompanying the



To provide adequate insulation, sea otter fur must remain clean and unmatted.

DEIS indicates the proposal to translocate the sea otters "is designed to accomplish a major recovery objective for the southern sea otter." It is unclear what FWS means by "recovery." The Marine Mammal Protection Act requires the FWS restore the "southern" sea otter population to its optimum sustainable population (OSP) level, but this has not been determined owing to insufficient information. The FWS has had primary responsibility for the sea otter population in California since 1972 and yet hasn't done anything to compute the OSP. Thus, the FWS does not know whether it has to take any action to increase the size of the existing otter population. In addition, a major flaw of the DEIS is it does not set forth any criteria for determining when the objective of recovery has been met.

The proponents of the translocation maintain the sea otter population in California is on the decline. In the DEIS, the FWS also makes this claim, but once again without any reasonable basis for doing so. To determine the growth rate for the otter population, the FWS appears to be relying on raw data collected in the '70s from which census "estimates" were projected. The counting methods and procedures for estimating the total number of otters from the individual counts changed from year to year. During

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the years (1982 to the present) when the Department of Fish and Game and FWS jointly participated in the counts, the census numbers have not only indicated stability in the number of otters, but also a potential recent increase with the largest actual count of 1,570 otters taken in the May-June census of 1986.

In the Draft Environmental Impact Statement, the FWS has identified San Nick as the preferred translocation site. The most frequently stated reason for the necessity of a translocation is the danger to the otter population of an oil spill along the Central California Coast and yet the FWS has identified a preferred translocation site where there is an even greater risk of oil spill. San Nicolas is surrounded by present and planned oil and gas drilling lease areas. Variable winds in the Northern Channel Islands would make it possible for spills anywhere in the Santa Barbara Channel to reach San Nick. In addition, a substantial percentage of all of the vessel traffic bound for the harbors at Los Angeles and Long Beach uses shipping lanes near or immediately adjacent to the island. All of these vessels carry substantial quantities of oil.

Another interesting fact to consider is the oil and gas industry supports the translocation. One probable explanation is the translocation would remove many of the arguments against drilling in the Santa Maria Basin, which is at the southern end of the otters' range. The oil and gas industry could then argue that even in the event of a spill there would be the other population to fall back on. Perhaps the risk to otters from oil spillage could be reduced by efforts to prevent any offshore drilling and rerouting vessel traffic—currently as close as nine miles from shore—farther out.

The most serious problem with a translocation of otters to San Nicolas revolves around the issue of containment. If the translocation is successful, it is unrealistic to think the otters will not spread to the other Channel Islands and throughout Southern California. The California Department of Fish and Game is opposed to a translocation that is not accompanied by guarantees of containment. Disregarding the difficulty of finding and capturing otters that stray from the site, one must have serious reservations as to the ability of the FWS to make an adequate commitment of funding and personnel to successfully carry out and then maintain the translocation plan. In light of the Gramm-Rudman mandates for major cutbacks in the budgets of federal agencies, it is extremely unlikely the federal government could fund the translocation effort after it is commenced. It is even more unlikely the California Department of Fish and Game would be able to foot the bill.

Allowed to go unchecked, the dispersal of the sea otters from San Nicolas would be the beginning of the end of the entire Channel Islands shellfishery. Sea

(Continued on Page 151)

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Berry's suggestion for this month
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SDM'S

U/W Video Course

Camera Handling Techniques

TEXT AND PHOTOGRAPHY BY JIM AND CATHY CHURCH

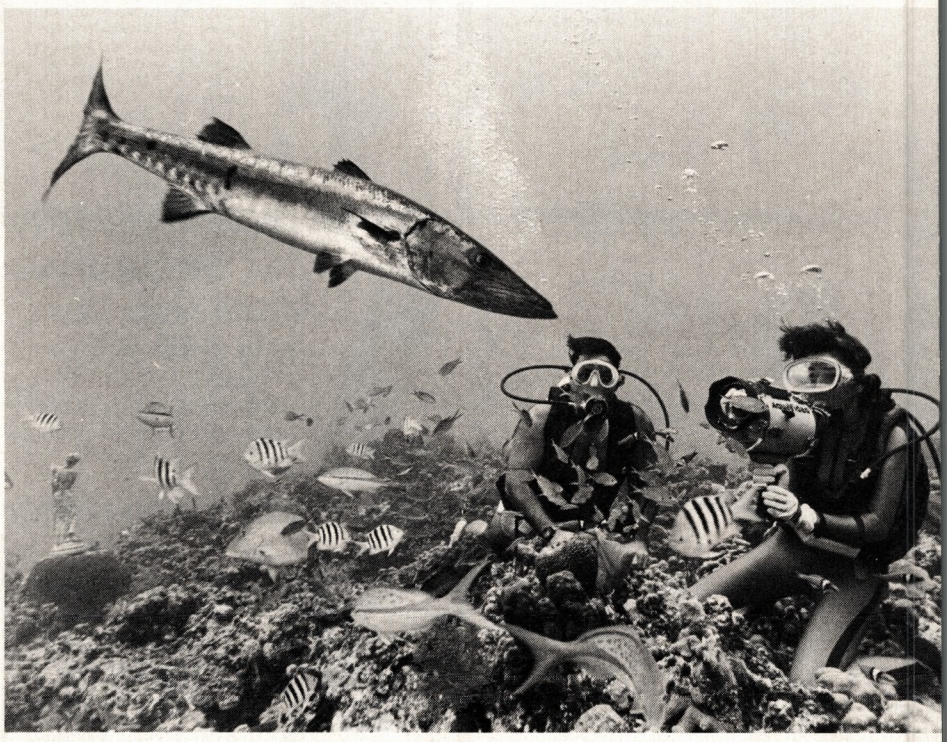
After you've viewed your first U/W video efforts, you'll probably agree you need to practice your camera handling and basic shooting practices. Thus, the purpose of this lesson is to help you develop techniques that will improve your video recordings.

GET IN CONTROL

There is no way to handhold an U/W video camera steady if you can't control your buoyancy and body movements. If you tend to float or sink, and must kick or use arm movements to hold your position, you aren't ready to use a video camera. Thus, step 1 is to develop the ability to maintain a midwater position with a minimum of fin action. The "wear 20 pounds of lead and use your BC" school of thought doesn't always apply. You must often move with your subjects; with a BC half full of air, you'll become too buoyant as you rise. Having to release or add air to your BC makes noise the camera microphone can pick up and can cause you to jostle the camera.

The camera should have close to neutral buoyancy. While some U/W photographers prefer a slightly buoyant camera that will float if dropped in the water, we prefer a slightly negative buoyancy so we can place the camera on the bottom. The camera shouldn't have a tendency to tilt forward, backward or to either side. If you let go of it, it should slowly begin to float or sink without any tilt. It will be difficult to hold the camera steady if its buoyancy and balance are fighting you. If necessary, use lead weights, or plastic foam, to adjust the balance.

With some larger systems—such as a housed camera and full-sized VCR—you may have to operate several switches in sequence in order to record. The controls to these switches may be bumped out of adjustment; and with some housings, the switches may not give a positive off/on feel when you work them. You think you've turned the camera off or on, but nothing has happened. Jim has shot several scenes thinking the camera was turned on and has swum around several times thinking the camera was off. If your camera system requires a series of steps (such as three or four switches that must be turned on in sequence) use a tape marker to attach a checklist to the housing and practice operating the switches.



If a fish glides by, try to anticipate its movements as you pan with it. Also, leave plenty of room between the front of the moving fish and the edge of the picture frame.

AIMING THE CAMERA

With some compact housings, you aim the camera by simply looking at the subject over the top of housing. When doing so, the natural tendency is to lower the housing a few inches to give you a better view of the subject. Thus, you end up aiming too low and chop the tops off your subjects. The way to eliminate this problem is to tilt the camera slightly upward and look from the side when you need to see the bottom of the picture area.

While aiming is easier with accessory framers or optical viewfinders, parallax can be a problem up close. You must learn at what point the lines of sight of the viewfinder and lens intersect. And, when close, you must learn to aim slightly above the subject to correct for parallax. Some viewfinders have a parallax adjustment, but making this may be difficult if the camera-to-subject distance is changing as you shoot.

You must learn to visualize the field of

GLOSSARY

Electronic Viewfinder: A viewfinder that shows the subject's image on a miniature TV screen.

Head Room: The space between the top of the subject and the top of the picture area. When shooting divers, avoid having the tops of their heads bump against the top of the picture.

Nose Room: The space between the front of a moving subject and the side of the video picture area. For example, the nose of a moving fish shouldn't bump against the picture edge.

Pan: Moving the camera from left to right or right to left.

Parallax: The difference between the line of sight of an accessory viewfinder and the video camera lens. These lines of sight meet at a predetermined or preset distance in front of the camera.

VCR: Video cassette recorder.

view the camera sees. If you aim by looking over the top of the housing, it's "by guess and by golly." If you have an accessory viewfinder, you must determine how accurately it shows the field of view. We suggest you select a stationary subject and carefully estimate just how much of the subject is in the picture. If you are in a pool, you can use an upward camera angle and count the number of tiles at the waterline that you think will be in the picture. Do this at selected distances. Then, play your tape and see how accurate your estimates were.

Some U/W video systems have electronic viewfinders or use a miniature TV set as the viewfinder. While these show the exact field of view the camera sees, make sure you can see images clearly in the viewfinder while underwater. We strongly suggest you insist testing such a system, in both bright and dim light in a pool, before you buy it. If you wear a prescription faceplate, make sure your eye can focus on the viewfinder image.



An excellent transition technique is to lead the viewer from one U/W setting to another by the movement of divers or other subjects.



Allow your subjects to swim into the scene and then travel through it. Hold the video camera stationary—don't pan with the divers.



Allow your subjects to swim fully out of frame, then cut to the next scene. This creates a cohesive transition between scenes.

LEARNING CAMERA HANDLING

Steady, smooth camera handling can make or break your U/W videos. If your camera handling is shaky, and if you move the camera quickly from left to right or up and down, you'll accomplish one goal: Your viewers will get seasick when they watch your tape! To help you develop basic camera handling skills, we suggest you practice these techniques:

1. Kneel on the bottom and aim the camera at a stationary subject. Shoot a 15 second scene while holding the camera as still as possible. Be sure to give your subject some head room. When you view the tape, see how steadily the camera was held. Don't move on to step 2 until you can hold the camera steady!

2. Starting about 15 feet from a stationary subject, center it in the viewfinder and swim slowly toward it until you reach minimum shooting distance. The goal is to keep the subject perfectly centered—without moving the camera.

3. This is the tough one! Hold your position in midwater as you aim the camera at a stationary subject. As in step 2, the goal is to keep the subject perfectly centered. Warning: Do not hold your breath and rise as you concentrate on the image in the viewfinder!

4. Kneel and pan a scene (move the camera from left to right or right to left). A slow pan is usually best—if you pan too fast or if the movement is jerky, the tape will be painful to view. Practice panning at different speeds from slow to fast to see which speed gives the best results.

5. Select a stationary subject, such as a seafan, set of tube sponges or other prominent object. Kneel on the bottom and aim the camera so the subject is in the lower half of the viewfinder. Without moving the camera, signal your model to swim into the scene at an angle, swim through the scene and then swim out over your shoulder. The model shouldn't look at the camera. This swim-through is an excellent transitional scene to lead the viewer from one U/W setting to another.

6. Choose a stationary subject (as above) or have a diver kneel on the bottom. Get a few feet above and to one side of your subject and swim around it as you shoot. Remember to give your model some head room. The goal is a smooth flow of motion as you take your viewers around the scene, keeping the main subject centered.

7. Shoot another diver as you both swim parallel about three or four feet apart. Because the camera is being held sideways to your direction of travel, you must swim slowly and take extra care to hold the camera steady.

(Continued on Page 152)

Kathie Mullins and Noel Rutt hold their bodies steady in midwater as they aim the camera at a stationary subject. The upward camera angle removes distracting background.



Diving News From Down Under

Coralita Under New Management

TEXT AND PHOTOGRAPHY BY GERI MURPHY

After 15 years of skippering the live-aboard dive boat *Coralita*, Wally Muller has retired and sold the operation to Alby Ziebel. The new owner is well qualified to handle this vessel. Ziebel has been diving for 22 years, including 10 years as a commercial abalone diver. He has served as a skipper on the Great Barrier Reef for the past 10 years and is an avid underwater photographer.

The *Coralita* is regarded as the celebrity dive boat of Australia. It has been used in the filming of underwater segments for *Jaws*, *The Deep*, *Reef Safari*, *Sea Safari* and numerous documentaries. It is the longest running live-aboard dive boat in Australia and the first to make regularly scheduled trips to the Coral Sea atolls of Marion Reef, Dart Reef and others.

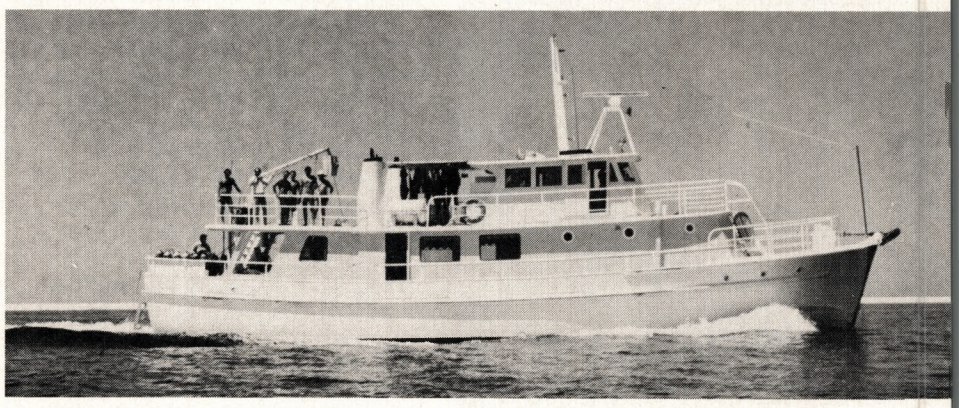
The *Coralita* is a 79 foot long vessel with a 20 foot beam and a draft of 7 feet. She is powered by twin Caterpillar diesels, cruises at 11 knots and has a range of 2,000 miles. She is equipped with modern instrumentation including: international radio telephone, automatic pilot, gyro compass, two depth sounders, radar and a desalinator. Since its purchase by Ziebel, the vessel has been completely refitted. The crew consists of Captain Alby Ziebel, engineer John Deacon, chef Ray Biddle and hostess Danielle.

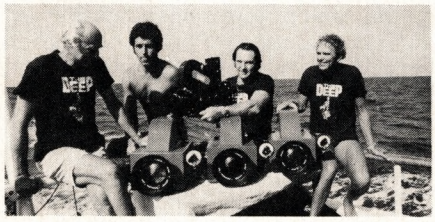
The *Coralita* has a passenger capacity of 12. Her accommodations include two large double cabins and four twin share cabins—all of which are air-conditioned. The vessel is fitted with twin 7 cfm air compressors and 14 tanks, which are kept full. A large stern diving platform allows easy access and exit from the water. The *Coralita* also carries an aluminum skiff with outboard motor for transporting divers among the coral shallows.

For 1987, See & Sea Travel and the *Coralita* have designed new programs of diving adventures. During the spring and summer they offer a series of weekly cruises on the Great Barrier Reef for only $930 per person. The *Coralita* is being moved from Yeppoon to Cairns, gateway to the Great Barrier Reef's best diving. These economical cruises will include such sites as the Ribbons Reefs, Pixie Bommie and the Cod Hole.

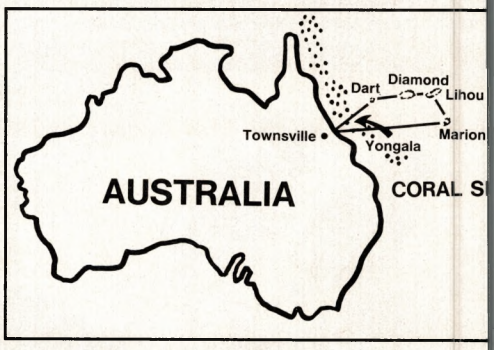
From September through January the *Coralita* takes advantage of calm weather and steams 150-300 miles into the Coral Sea to such mid-ocean atolls as legendary Marion Reef. With water clarity ranging from 150 to 300 feet, the *Coralita* takes dive guests to see rays, turtles, immense soft corals and one-half dozen species of sharks. Within Marion's 15 mile long protected lagoon there are more than 50 vertical pinnacles that rise from the 200 foot deep bottom to within 10 feet of the surface. Each of these re-

(Continued on Page 152)









Top: The 79 foot M/V *Coralita* cruises at 11 knots and can carry up to 12 divers. Above left: The *Coralita* has hosted many underwater film crews including one for *The Deep*—left to right (in T-shirts): Stan Waterman, Al Giddings and Chuck Nicklin. Left: Alby Ziebel, owner of the *Coralita*.

CORALITA 1987 schedule

6 day Barrier Reef trips*

April	15-22
May	9-16
June	6-13
July	11-18
August	11-18
September	5-12

*from Cairns, Australia

Coral Sea trips**

September 24	to	October 5
October 4	to	October 17
October 18	to	October 29
October 29	to	November 9
November 8	to	November 19
November 29	to	December 10
December 11	to	December 22
December 22	to	January 2

**from U.S. West Coast

SEA OTTER

(Continued from Page 145)

otter foraging is so efficient it reduces the population of its prey to a level that cannot be used by humans. The substantial reduction of the pismo clam population by the otter has been well documented. When the southern limits of the otter's existing range extended through Pismo Beach, the population of Pismo clams was wiped out despite the closure of parts of the beach to digging. As Dan Miller, now retired from the Marine Resources Division of the California Department of Fish and Game, cited in his 1980 report on the California sea otter, "In all cases where otters have moved into either pristine areas where there has been no human take (i.e., in natural preserves) or in zones of utilization, there has been a reduction of more than 90 percent in the numbers of shellfish."

While the otter is a well loved attraction in Central California, a translocation to San Nick or anywhere else along the California coast that experiences heavy sport diving usage connected with shellfish would seem to be an ill-conceived plan at best and would be opposed by the diving community as a whole. Most California divers welcome the protections currently extended to the otter population in California. However, that same community would extend those same protections to the populations of urchins, abalone and other invertebrates that now prosper under the management policies of this state. Protection of one species shouldn't be overemphasized to the detriment of others, potentially endangering the balance of the marine environment.



Are California's sea otters a unique subspecies? Are they endangered?

The most logical and practical approach to the problem seems to be a plan that not only provides for increased protection to the existing population of otters in California by taking steps to reduce the threat of oil spills and gill netting, but one that also provides for management policies to prevent range expansion to the south. If the existing population of otters gets to Point Conception, the closest Channel Island—San Miguel—is only 30 miles away and the otters could quickly spread through the rest of the Channel Islands. The reduction of the threat of oil spills and the preclusion of drilling sites in Central California would certainly strengthen the existing population of sea otters in California, which is already in a much more stable condition than the proponents of the translocation plan claim. It would also avoid the unnecessary elimination of the important sport and commercial shellfisheries elsewhere in California.



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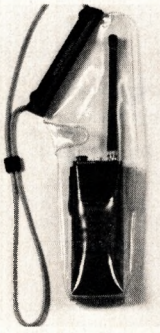
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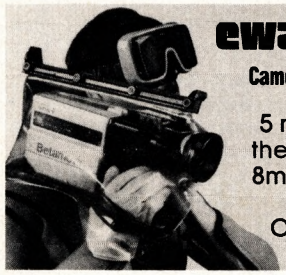
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DOWN UNDER

(Continued from Page 150)

markable spires is covered with soft corals and marine life.

Several of the 10 day Coral Sea cruises will depart from Cairns or Lizard Island to show the superb diving at Bougainville Reef, Osprey Reef and the highly entertaining Cod Hole. The remaining departures will leave from Townsville or Hayman Island and feature the spectacular beauty of Marion Reef plus the wreck of the *Yongala*.

Since 1972, visiting divers have described these Coral Sea cruises as some of the world's greatest diving adventures. This year a new price of $2,450 brings them within reach of a host of new divers who will discover why the Coral Sea is so famous. Divers will find the *Coralita* ideal for groups of 8 to 12 divers who wish to share this ultimate adventure on magnificent reefs.

For reservations and further information about *Coralita* cruises, contact: See & Sea Travel, Inc., 50 Francisco St., Suite 205, San Francisco, California 94133; telephone (800) 348-9778 or (415) 434-3400.

VIDEO COURSE

(Continued from Page 149)

8. If an angelfish, grouper or other docile fish glides by, try to anticipate the fish's movements as you pan with it. Remember to give the fish some nose room.

9. Swim slowly along the reef with the camera aimed ahead of you. Swim at the speed you think is correct, then repeat the same scene while swimming at about half the speed. View the tape and compare the results.

10. While you are stationary, about three to five feet from the side of the anchorline, shoot one or more divers as they descend. Begin with an upward camera angle and use a level camera as they pass you on the way down. Then, with a downward camera angle, allow them to swim out of the frame.

CONCLUSION

The basic camera handling techniques presented in this lesson are a necessary foundation for the advanced U/W video techniques we will present in future articles. If you can't get to open water, get started in the controlled environment of a swimming pool.

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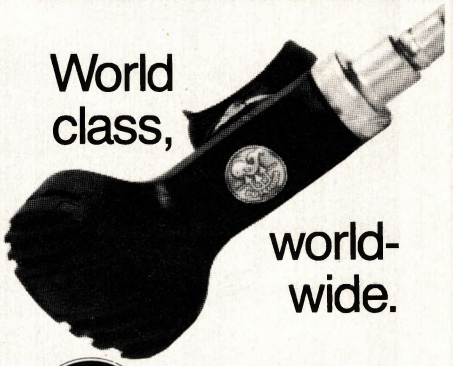
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DIVING



photos/David C. Haas

UNDER THE ICE

Winter Wonder Sport

BY KEITH SZUTER

Each bubble rises to the ice, then slides laterally along the smooth surface until it finds an indentation and pools there with the others that preceded it, forming a silvery patch on the dark mass. These pockets of air will remain trapped there until the ice melts, enabling them to escape. As I lie watching them, I'm suddenly struck by the thought that spring break-up is months away, and those silvery reminders of each of my exhaled breaths are trapped there for a very long time. "Better you than me," I think as I exhale once more before rolling over and continuing my exploration.

As I swim 30 feet beneath the 18 inches of ice that cover Lake Owen in northern Wisconsin, I am continuously amazed at the clarity of the water. We had cut two holes into the ice, 150 feet apart, to gain access to the water below. As I look through the water between the two holes, I can see not only the opposite hole, but far beyond it as well.

I'm a little disappointed by the lack of things to look at. The bottom of Lake Owen is an uninteresting carpet of silt, broken here and there by skeletal trunks and branches of trees that had fallen into it long ago. They are slowly being covered by layers of muck. There is not a fish to be seen; they sought deeper water with the onset of winter and lie dormant as they await spring. Two crayfish and a few golfballs later, I've run out of things to see. I still have plenty of air, so I amuse myself by pulling off my fins and walking upside down on the ice.

Despite the excitement I feel at being below the ice, the cold water is beginning

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Photograph by Steven M. Barsky

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ICE DIVING

to get to my feet and I know I should surface soon. My dive timer shows I have been down 25 minutes, so, with some reluctance, I give three tugs on my safety line and begin my ascent.

A safety diver hovers in the sunlight that streams through the hole in the ice. As this is my first ice dive, we decided to have another diver in the water besides the safety diver on the surface. Unlike sport diving, ice diving is usually a solo venture since the safety lines of two divers could become entangled. The added precaution of the other diver proved unnecessary, but you can never have too many safeguards in ice diving.

The stream of sunlight coming through the hole contrasts against the dark, snow-covered ceiling of ice; it reminds me of sunlight coming through a break in storm clouds. The diver suspended in the clear water—illuminated by the shaft of light—appears to be flying.

As I break the surface of the water within the hole, I grab the edge and with the help of my tender, clamber out onto the ice. As I remove my safety line and tank, the second diver surfaces and is helped from the water. Freed of my equipment, I head for the boathouse we are using as a dressing room, intent on getting out of my wetsuit as fast as possible. Even though the weather is relatively warm for February, my cold toes tell me I don't want to waste any time warming myself up.

Dried off and dressed in warm clothes, I return to the dive site and prepare to be a tender for Al, the next diver. He and I are the only wetsuit divers. Gary, our instructor, and the three other divers, Ellen, Terry and Paul, are all using drysuits. They dived before Al and myself so we wouldn't have to stand around shivering.

After strapping a pair of insole creepers on my feet to get better traction on the ice, I coil the safety rope in a figure-eight. This will allow it to feed out smoothly as the diver progresses.

Meanwhile, Al prepares for his dive. Clad in his quarter-inch Farmer John wetsuit, he takes an ice diving harness and buckles it on. The harness has two straps that pass over the shoulders and attach to a strap that encircles the torso just below the chest. The shoulder straps have four large D-rings attached; two on the front and two on the back. The safety line is attached to one of these D-rings, depending on the diver's preference.

After donning his buoyancy compensator, tank, fins, weightbelt and facemask, Al lumbers over to the hole and prepares to enter the water. As tender, I check to make sure all his equipment is secure and the safety line is properly attached. After I tell him everything is all right, Al



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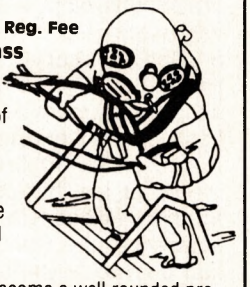
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sits at the hole with his feet hanging over the edge, then swings around and lowers himself into the water.

For the next 25 minutes, I am Al's only link with the outside world. He is cut off from me by 18 inches of ice and the only means of communication we have is through the safety line. Messages are relayed between diver and tender by tugs—in this case the basic signals used by the Navy since 1970:

Signals, Diver to Tender

1 pull I am all right.
2 pulls Give me slack.
3 pulls.....Take in my slack.
4 pulls Haul me up.

All signals from the diver are acknowledged by the tender with corresponding pulls on the line.

Emergency Signals, Diver to Tender

2-2-2 pulls.....I'm fouled—need help.
3-3-3 pulls.....I'm fouled—need no help.
4-4-4 pulls Haul me up immediately.

Beneath the ice, a diver faces many potential problems that could be life



threatening if he/she were not properly prepared, both physically and mentally. The best preparation is to enroll in an ice diving specialty certification course. This is how I came to be diving Lake Owen.

The greatest problem facing the ice diver is the cold; all other problems arise from it. The diver must be able to recognize the symptoms of cold stress and hypothermia, as both of these will reduce his/her ability to think and react quickly, especially in an emergency situation.

Another problem facing the ice diver is the potential of a freeze-up in either the first or second stage of the regulator. This situation may be avoided by using a regulator designed for cold water diving.

Breathing from the regulator or purging it before submerging increases the possibility of a freeze-up. The diver should not place the regulator in his mouth until he/she is underwater.

The ice diver must plan ahead when deciding how long to remain beneath the ice. The biggest factor in determining bottom time is air consumption. This is estimated the same way as in wreck or cave diving: one-third of your air is used for descent and exploration, one-third for ascent and one-third is reserved.

Observing that great expanse of ice stretching overhead until the darkness it creates limits how far you can see, and the incredible water clarity, add to the other-worldliness of the sport. With proper instruction and preparation, a diver of adequate skill may enjoy an experience that has previously been a hazard.

There really is no reason northern divers should ignore their favorite dive sites during winter, especially when there is the added attraction of no power boats zipping around overhead. Improved skills and safety consciousness, plus the added incentive of avoiding cabin fever, equal a winter of underwater excitement for those divers who are willing to take the chilling challenge of ice diving.

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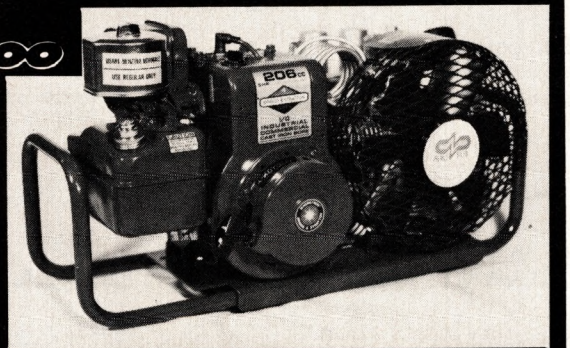
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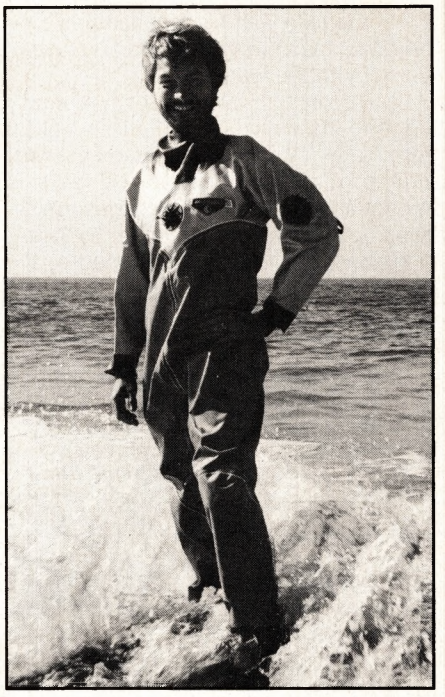
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photos/Bonnie J. Cardone

NAUTILUS O.S. SYSTEMS

Versatile Drysuit

BY JIM WALKER

There've been a few changes since SDM last reviewed a drysuit from Off-Shore Diving Equipment. First, the company has changed its name to O.S. Systems, Incorporated. Along with the name change comes an expanded product line. Three excellent drysuits are offered: an economy model, a commercial grade model and the versatile Nautilus.

The Nautilus is available in six sizes (XS-XXL) and now it comes in a choice of two fabrics:

For divers requiring extra protection from abrasion and punctures, the heavy duty, original Nautilus is made of 420 denier nylon pack cloth. This material is impregnated with three layers of liquid polyurethane, then laminated with a high molecular density polyurethane film. One of the nicest features of this fabric drysuit is its light weight—only 3.5 pounds. And, rolled up, the suit takes up less space in a gear bag than a pair of neoprene farmer johns. The heavy duty Nautilus is available in yellow/royal blue, red/royal and custom colors.

For divers wishing an even lighter suit offering a smoother fit, the newest version of the Nautilus is made of a 210 denier, high tenacity, military spec nylon twill fabric. The waterproof coating is neoprene rubber with a polyurethane top coat. The suit is available in lustrous silver/royal blue, silver/aqua and aqua/

royal blue. Underwater models and divers enjoying less harsh conditions may find this suit answers their needs even better than the original Nautilus.

Both versions of the Nautilus feature the same rugged construction. All seams are sewn with quadruple locking stitches and are fusion sealed to prevent leaks. The knees of the suit have a second layer of nylon sewn on for puncture resistance.

The neck and wrist seals of the Nautilus are made of stretchy Long-Life latex rubber. The suit is available with attached latex socks or the new latex Lite-Boots. These latter are a hybrid between latex socks and heavy vulcanized boots. They are tough enough for walking and flexible enough to fit comfortably in dive fins.

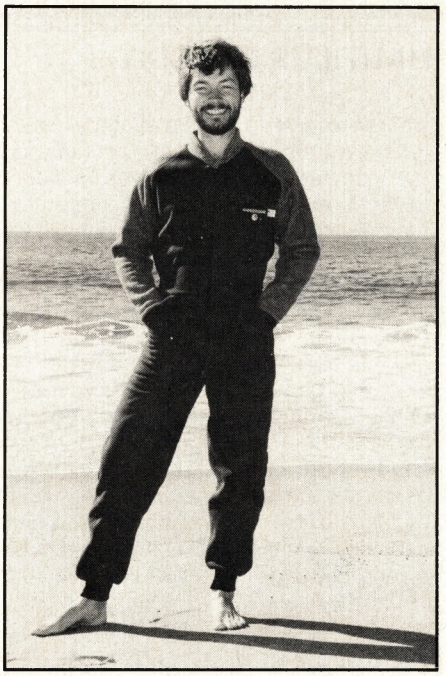
The Nautilus' ankles have sewn-on, Velcro closing cuffs (Sox Protectors) that overlap and protect the boot/leg junction as well as restrict the movement of air into the boots during a dive.

The Nautilus drysuit features a push-button activated power inflation valve on the chest. A low pressure hose attached to the regulator supplies the air. The suit's deflation valve is on the left arm.

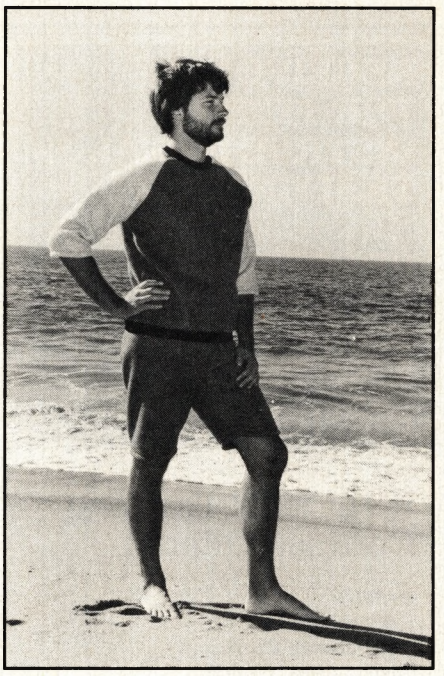
The diver enters the Nautilus through a sturdy, waterproof metal zipper across the back of the suit's shoulders. The zipper tab has a four inch long finger loop.

The Nautilus will keep you dry, but by itself it can't keep you warm. Insulation is provided by the garments worn under the suit. O.S. Systems offers various types of drysuit underwear that can be worn in single or multiple layers. And, the 17 ounce Arctic Fleece material insulates well even when wet. A point to note is, as with any drysuit, the more undergarments worn, the more air held in the suit and the more buoyant the diver will be. This translates to more weight necessary.

Four different garments of Arctic Fleece are available. Worn singly or in combination, they will allow the Nautilus



Peter Jensen in the Arctic Fleece jumpsuit. It's comfortable during a dive and after.



The T-top and Bermuda shorts can be worn under the jumpsuit or by themselves.

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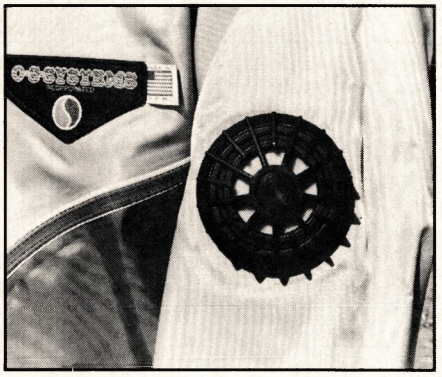
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NAUTILUS DRYSUIT

wearer to dive in a wide range of water temperatures. The full length jumpsuit ($99) features raglan sleeves, a fleece collar, a double tab full length zipper, two hand warmer pockets, crotch gusset and knit ribbing ankles. It also makes great after dive wear. A shorty version of the jumpsuit ($78) has elbow length raglan sleeves and knee length legs. The T-top ($33) is basically a pull-over sweater designed to be worn before/after your dive and under one of the jumpsuits while diving. It can be accompanied by Bermuda shorts ($30, combo $63). All of these garments are machine washable, won't shrink and dry quicky. As an added benefit, they wick moisture away from the diver's body for increased comfort.





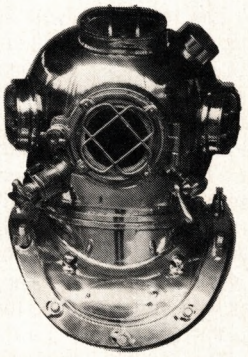
The Nautilus is deflated through a push-button operated valve on the upper arm. The suit is available with latex Lite-Boots (above) or with latex socks. Velcro closing Sox Protectors cover the boot/leg union.

In either fabric, the Nautilus retails for $875. This price includes all the undergarments except the shorty jumpsuit. It also includes a dry bag, a hood and low pressure inflation hose. The hood is available separately for $35. The Nautilus' valves have a lifetime warranty for the original purchaser and the suit has a two year warranty against defects in workmanship and sewn seam construction.

See the Nautilus at your O.S. Systems dealer. For information contact O.S. Systems, P.O. Box 864, Scappoose, Oregon 97056; (503) 543-3126.

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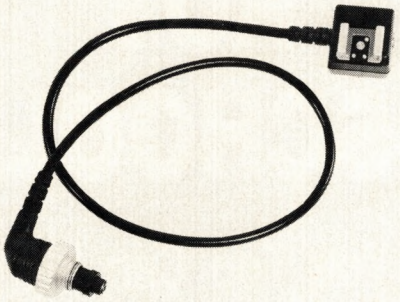
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TEXT AND PHOTOGRAPHY BY GERI MURPHY



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The hot shoe slips into the mount on top of the Nikonos V and locks down with a threaded ring. This shoe will accept any standard ISO flash shoe mount, such as those found on most current strobes.

The sync cord and shoe mount will work in either the manual or TTL flash mode. It will allow perfect TTL flash photography when used in conjunction with Nikon's SB-15 strobe. This is a compact lightweight unit one-third the size of the Nikonos camera.

For more powerful TTL flash you may wish to select the Nikon SB-16B strobe. It is larger and equipped with both a standard flash tube and a mini flash tube.

The V-Type Sync Cord has a couple of interesting features that extend its capability. It is equipped with two TTL connector ports for multiple TTL flash photography. It is also equipped with a removable base screw that allows the hot shoe to be mounted on a tripod.

The V-Type Sync Cord retails for $75. The SB-15 sells for $175 and the larger SB-16B sells for $270. For more information contact your local Nikon dealer or write to: Nikon Inc., 623 Stewart Avenue, New York, NY 11530; telephone (516) 222-0200.



With a TTL hot shoe at the strobe end, the Nikonos V-Type Sync Cord connects to any topside flash.

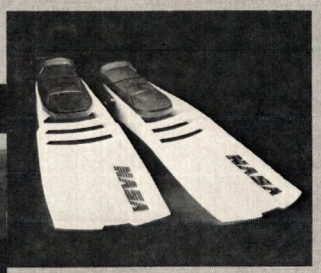
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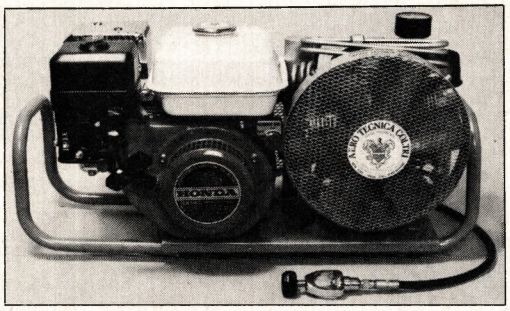
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ROV SCHOOL

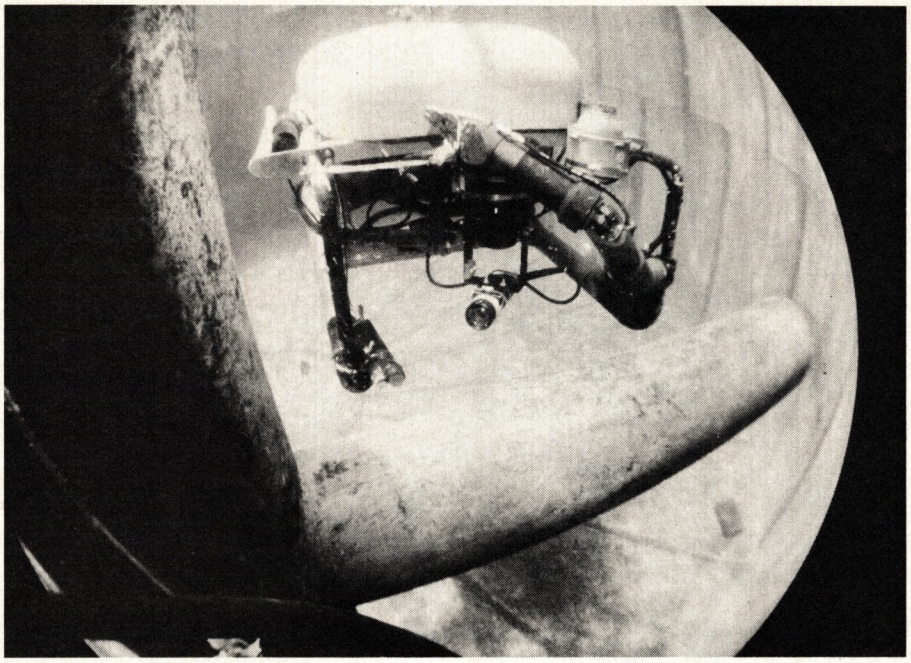
You Too Can Fly Thousands Of Feet Underwater

BY E.R. CROSS

In the past 20 years there have been dozens of almost unbelievable underwater missions accomplished. Four of these have been headline grabbing stories that read like science fiction. To me, the most sci-fi appearing tasks were the finding and recovery of the 20 megaton hydrogen bomb accidentally dropped into deep water off the coast of Palomares, Spain; the recovery of parts of the Korean Airlines flight 007 plane off Russia; the location, photography and recovery of major, and critically important, parts of the shattered space shuttle; and the exploration inside the scattered wreck of the *Titanic* two and one-half miles deep in the North Atlantic Ocean. Each of these fantastic underwater accomplishments was unique. Yet they, and many of the other hundreds of fascinating U/W projects, had one common factor: ROVs (Remotely Operated Vehicles) were used in all or part of their missions.

In one form or another ROVs have been around for a long time. However, the modern concept of the vehicle began in 1953 when Dimitri Rebikoff launched his ROV Poodle, a modification of the Rebikoff Pegasus. Since that early beginning, dozens of ROV designs and hundreds of machines have become available, some having general capabilities while others are dedicated machines that can perform only one or two functions.

Until recently, learning how to operate and maintain an ROV was strictly by on the job training; a diver had to "grow up" with a company that either designed or utilized ROVs. Such is no longer the case. In January 1985, the Underwater Vehicle Training Center was established in Houston, Texas. This approved training institution is dedicated to providing the marine industry with competent ROV pilot/maintenance/technicians. The Underwater Vehicle Training Center (UVTC) is a division of the Professional Diving



photos/Gary Parsons

A porthole view of the ROV, Recon IV, inspecting an oil rig node installation in a training tank. ROVs are utilized worldwide to perform underwater tasks at extreme depth or where conditions are too hazardous for divers. The type of job an ROV can accomplish will depend on the type of manipulators, tools and accessories fitted to it.

School of New York.

ROV TYPES

It is difficult to categorize ROVs. When does a piece of equipment dragged across the ocean bottom to accomplish a specific task become an ROV and not just a tool? Most writers on U/W work accept as an ROV any device that can maneuver in at least two dimensions and has closed circuit TV to transmit information to observers (usually pilots or operators) on the surface. If this description is accepted, there are at least five general types of remotely operated vehicles.

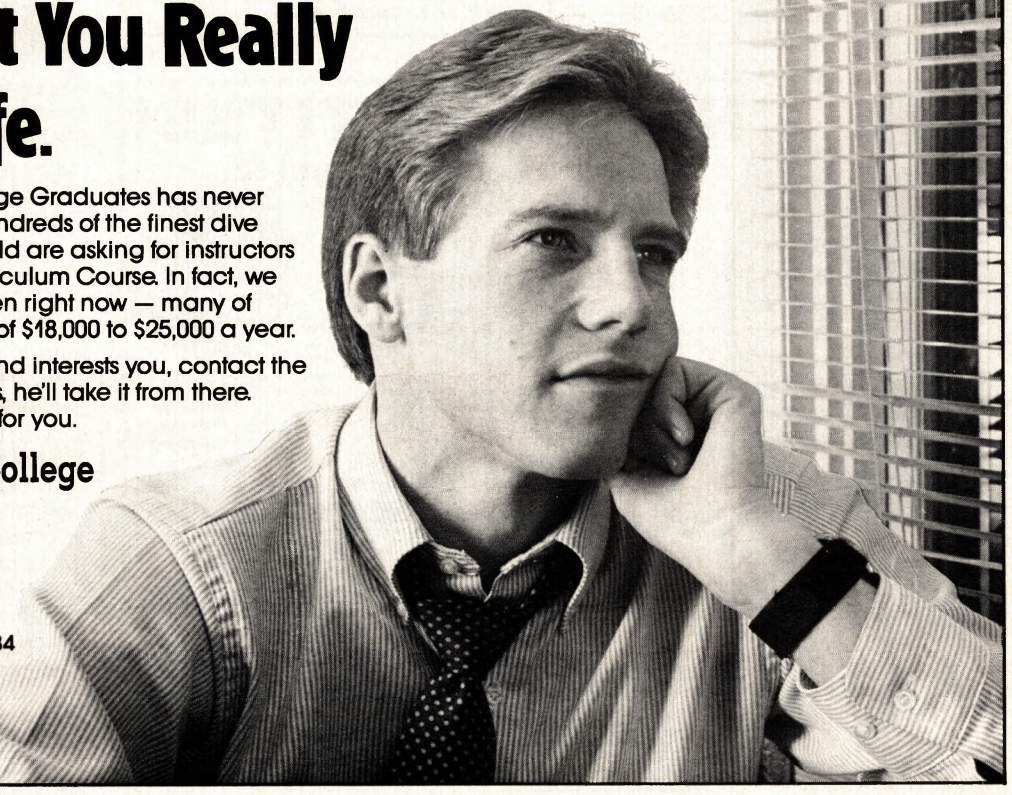
The aristocrats of ROVs are the tethered, free swimming types. Almost all of them seem to take on personalities and, without fail, names. The most recent, and perhaps destined to be the most famous, is Jason, Jr., the ubiquitous little machine that "flew" down the grand stairway and peeked through portholes into staterooms of the sunken liner *Titanic*. Jason, Jr. was piloted from within the manned submersible *Alvin*, which safely tagged along behind and always outside the potentially hazardous interior of the *Titanic*.

The first tethered ROV was called Poodle. Between Poodle and Jason, Jr. are found such names as Recon V, Scorpio, Deep Tow and Tums.

Vehicles are said to be "bottom reliant" if they are designed to work only in contact with the ocean bottom, such as during pipeline or cable trenching and inspection of pipeline burial. These are usually heavy machines, weighing many tons, and almost always can perform only one and sometimes two, tasks.

"Structurally reliant" ROVs are designed to work while in contact with some structure. They perform such functions as pipeline inspections and subsea platform inspection and maintenance. Some hull cleaning machines are of this design.

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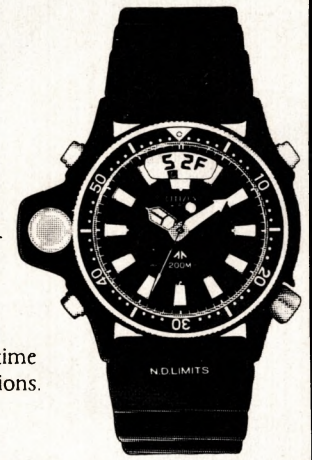
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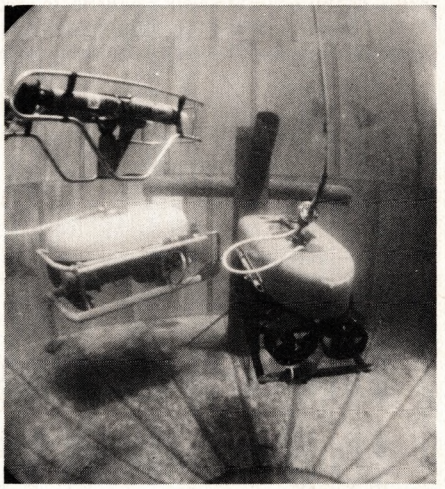
ROV SCHOOL

"Midwater" ROVs are just that; devices that operate somewhere between the surface of the water and the bottom, or between the surface of the water and an U/W structure. Generally this type of vehicle is fitted with sophisticated instruments such as sidescan sonar, cameras or TV and is used primarily for search, mapping and positioning. Some vehicles may have additional instrumentation.

In recent years "untethered" ROVs were developed. These are primarily computer controlled vehicles but may also be controlled acoustically to some extent. Photographs, video recordings and other data are stored internally and recovered when the unit surfaces.

AN ROV SYSTEM

A complete ROV system is made up of several components. While each of the several systems manufactured may vary, certain key elements are usually present. They are:



Three types of ROV are maneuvered at once in the training tank. Such tasks teach UVTC students how to work together.

1. The handling system, composed of the deck windlass and wire.
2. The umbilical.
3. The launcher that holds the vehicle until it is in the water and released.
4. The tether that leads from the launcher to the vehicle.
5. The vehicle to which tools, sensors and grabs are attached.

These parts of the complete system hoist the vehicle over the side and get it into the water. Topside, there are other parts of the total system. They include:

1. The power pack that provides electric and hydraulic power to the manipulator on the vehicle as well as to the tools and sensors.
2. The control console that looks like a sophisticated TV game control, with a closed circuit TV and two joy sticks, controls the movements of the vehicle and the tools.

3. There may also be sonar to enable the pilot to keep track of his vehicle with relation to other underwater objects.

ROV PILOT TRAINING

In addition to the several types of instrumentation found in ROV systems, the varying conditions under which the vehicles must be worked dictate the pilot be well trained. It is well recognized in the industry that the results obtained by any ROV system do not depend entirely on the unit, but to a great extent on the skill and experience of the pilot or operator. The better the operator, the more efficient the ROV.

OBJECTIVES OF UVTC

The stated objectives of the Underwater Vehicle Training Center are: "... to develop and refine the student's competence in vehicle operations, underwater work and the use of underwater vehicles and associated sub systems, seamanship, rigging and the operational support involved in such missions." In accomplishing this, the school functions to meet four basic goals that will be the keys to the graduates' success in the various marine industries:

1. ROV crews must learn to work as a team with others in the work force.
2. The ROV pilot must acquire equipment competence.
3. The ROV pilot must learn to operate the vehicle to ensure the safety of all support personnel, both topside and U/W.
4. The ROV pilot/technician must be able to service and repair the ROV system in the field so it has a minimum of down time.

Each training project at UVTC has specific elements and degrees of difficulty that must be performed competently by student team members. The skilled UVTC instructors teach students how to recognize and cope with these difficulties.

Students receive a full electronics technician's tool kit while in school. More than 1,500 pages of instruction manuals are given them. This material provides maintenance and repair data for every major ROV on the market today. The material is updated as new vehicles are developed and deployed.

COURSE 100

UVTC's full time ROV/Pilot/Technician Course 100 is designed to train students for entry level ROV positions. It lasts eight weeks and convenes five days a week for eight hours each day, making the course length a total of 320 hours.

The complexity and thoroughness of the UVTC program is reflected in the contents of its training modules. The first day is devoted to introducing the school and the course. The second phase starts on day two and covers the vehicle systems such as structures, ballast, propulsion, hydraulic systems theory and the electric/electronic components and theory.

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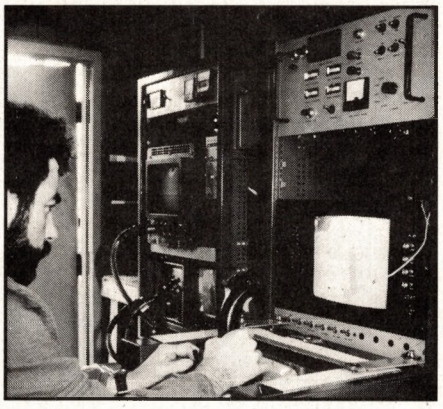
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ROV SCHOOL

Andre Galerne, founder of International Underwater Contractors, stated in a paper presented to the Department of Transportation, Spain: "ROVs are not confined solely to inspection roles and many are equipped with a wide variety of manipulators and various other instruments. The amount and diversity of work they can perform is not to be thought of as exhausted with the current technology, and their future use promises to be both interesting and extensive."

It is with this concept in mind that much of the course is designed. Section 3, as outlined in UVTC's training schedule, Tools and Sensors, provides the student with a detailed review and analysis of 25 standard and optional systems available and their impact on job requirements.



A UVTC student trains at the controls of an ROV. The video image transmitted by the ROV is the pilot's only guide.

In a letter to me, Gary Parsons, formerly UVTC director of admissions, said, "The primary goal of UVTC is to develop technicians. The types of vehicles used at UVTC include, but are not limited to Recon III, Recon IV, Phantom 500, Mini-Rover, Sea Scanner and RTV 100." Sections four through eight of the course deal with various components of all of these units and any others available to the school, such as controls and consoles, power distribution, umbilicals/tether/cables, acoustics, and handling systems. In-depth coverage of these subjects ensures adequate training for students to handle any assignment.

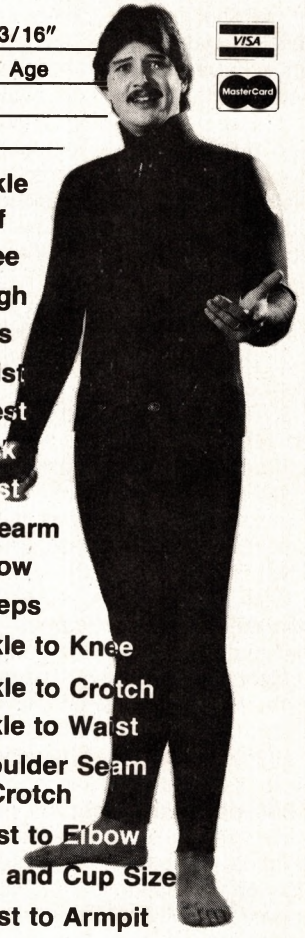
The inventory of ROVs at the Remote Vehicle Training Center represents an assortment typical of major offshore machines plus the new small LCROVs (Low Cost Remotely Operated Vehicles) that are beginning to dominate the inshore market in harbors, lakes, dams and atomic reactors.

RVTC is staffed with thoroughly field trained and qualified instructors to help students reach their training objectives.

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Gerald Hart, training director, has 13 years' experience in the field. Billy Joe Reed, curriculum consultant, also has 13 years in the ROV business, and Ken Baumgartner, chief instructor and sales manager, has years of experience in both diving and ROV operation. All of these full time instructors have worked for major user/owners of ROVs based in the Gulf of Mexico area and have been involved in the design of ROVs.

Some outside companies are used to teach specific, highly technical subjects. These include an acoustic system program taught by Honeywell and a full hydraulic course taught by Parker-Hannifin. Both companies are industry leaders in their fields.

The next five sections of the training program deal with operations and other considerations: crises management, personnel, project types and management.

In his lecture in Spain, Andre Galerne said, "One of the most important limitations (of ROVs), perhaps the most subtle one of all, is the lack of depth perception provided by a TV monitor. The performance of even the simplest task with a manipulator using only the picture presented on the monitor screen was very frustrating and fatiguing." This limitation can almost be completely overcome with adequate training and experience as a pilot. UVTC's training manual, in the section on Pilot Training, states, "Hands on training in piloting an ROV for specific . . . tasks will give considerable pilot time hours by graduation." Chief instructor Ken Baumgartner told me, "Students can get as much as 80-100 hours of pilot time during the course." The school has a 126,000 gallon, 24 foot deep training tank capable of producing a three knot current, in which students practice the many jobs to attain proficiency.

Also included in this last section of training are courses in inspection project assignment, manipulator job assignment and, perhaps equally as important as the how-to of accomplishing a job, training in logbook maintenance. No job is complete without a thorough record of the operation. Record keeping of several kinds is important not only for the files of the pilot/technician, but also for any possible legal problems that may develop on or about the job at a later date.

ROV JOBS

There is a pronounced trend by the offshore oil industry to perform as much work as possible with ROVs instead of divers. Gary Parsons told me, "The offshore oil industry in both the United States and other oil patch areas is performing most underwater work with ROVs with the use of divers as a second choice." Certainly, in some areas of oilfield work this is true, particularly working at depths in excess of 500 to 1,000 feet. Primarily, the choice of using an ROV is for safety of the diver. The industry felt since it was impossible to remove the

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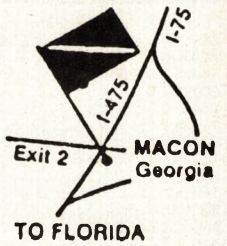


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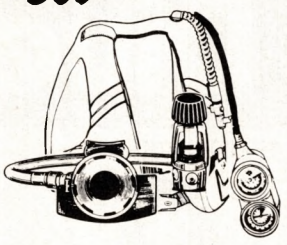
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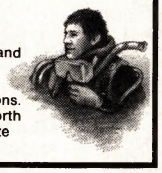
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ROV SCHOOL

hazards of deep diving into complex structures, it was advisable to remove the diver from the hazard. The obvious answer was to develop and deploy unmanned, remote controlled vehicles whenever conditions indicated this would be advantageous.

A secondary reason for using an ROV system was cost. A recently published (1986) analysis indicated the cost of deploying a deep diving platform with a complete crew of divers would be about $27,000 per day. An ROV system deployed to accomplish a similar task would cost only about $12,500 per day.

The kind of job an ROV can accomplish will depend on the type of manipulators, tools and accessories fitted to the vehicle. At UVTC, students are trained to recognize the type of equipment, tools and fittings that should be attached to an ROV to accomplish specific jobs.

The tethered class of ROVs is by far the largest group of underwater vehicles currently being used. Even though this type has a tether, it is not a towed unit. Rather, the tether or umbilical serves to carry power, control signals and other data to and from the vehicle. The ROV's umbilical can be compared to the umbilical leading from the surface to a helmet equipped diver on the ocean bottom. Topside, the diver's tender can feel the movement of the diver but does not usually try to influence those movements. In almost all jobs done by ROV, the pilot controls the vehicle only enough to "fly" it to the job and then monitors its movements and receives any communications it may send to the surface.

In the fields of offshore and inland areas of underwater work, some of the exciting and demanding work a pilot/technician may be called on to perform could include:

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There are, of course, many other kinds of interesting jobs for the ROV and its pilot/technician to perform in the areas of offshore oil exploration, drilling and pro-

duction—work that requires evaluation and choice of tools and/or attachments to the vehicle. UVTC graduates will be thoroughly competent in this important phase of ROV work.

To implement the plans of the pilot/technician, ROVs can be equipped with a wide range of sensors, manipulators and other instruments that permit performance of various tasks. These can include, but are not limited to, TV, still and motion picture cameras, non-destructive testing (NDT) instruments, current and acoustic sensors, leak detectors for pipelines and risers, submarine hoses, various work tools, scientific midwater and seafloor instruments.

There seems to be an extremely bright outlook for ROV use in the wide acceptance by all phases of the oil industry; also in many other underwater oriented industries such as hydroelectric companies, where inspection of dams is required; organizations involved with deep water research; submerged aircraft location and recovery; tunnel work (underwater); and vessel location.

Another important task of an ROV is monitoring divers working under extremely hazardous conditions and assisting them in their tasks. When necessary ROVs rescue divers in trouble. Finally, ROVs can work safely in water too polluted for man. This kind of pollution might include radiation, chemicals and, to a limited extent, temperature.

ADMISSION REQUIREMENTS

The Underwater Vehicle Training Center has a firm set of minimum standards for acceptance of students for the training program that permits developing strong hydraulic, electronic and other skills needed to accomplish the difficult and challenging jobs. Applicants for training are similarly subject to examination and evaluation based on the school's study of vehicle projects and the qualifications needed to complete them.

Each applicant for vehicle training must have a UVTC approved medical examination administered by a licensed and qualified physician. Prospective students should write to UVTC for registration and enrollment information. After carefully following each step of the enrollment procedures, prospective students will be sent a home study and self-examination package. This is UVTC's way of ensuring the student is familiar with ROV terminology and basic concepts of hydraulics and electronics before the class begins. It is important that prospective students carefully evaluate their background and experiences. Being an ROV pilot and technician is not for everyone.

The need for careful evaluation of students is summed up by Gary Powers, "In the past, employers were forced to use two people to work an ROV. They needed electronics technicians to maintain, troubleshoot and repair the vehicles but they also needed divers to fly the machines with safety in the underwater environment." Later, he added, "UVTC's goal is to provide the single individual who is capable of providing the qualifications in both areas of expertise." And, it is working. Feedback from offshore industry managers indicates companies are happy with UVTC graduates. Records show placement of graduates has been more than 90 percent for every class since the school opened.

There is, at present, little new exploration and development in the offshore oil patches. Also, new construction in all the marine fields is quite depressed. Existing structures, many of them more than 20 years old, require carefully planned and executed inspection and maintenance programs. These areas of U/W work are the strongest spheres of work for the ROV and ROV technician.

If you have a desire, "To fly at 20,000 feet," underwater that is, write to the Underwater Vehicle Training Center, 10046 Chickasaw Lane, Houston, Texas 77041. The telephone number is, toll free, (800) IUC-ROVS or in Texas call (713) 690-0405. As a scuba diver, you will never reach such depths, possibly not even ten percent of them. But, if you are already a diver and skilled in electronics, hydraulics and have a high mechanical aptitude, being able to fly an ROV to any depth may be the future for you.

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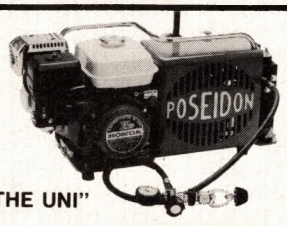
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BILLION DOLLAR SHIPWRECK

The U/W archaeological research ship R/V *Beacon* recently returned to Grand Cayman from a voyage of exploration and salvage to the northern Bahamas, where the lost remains of a 17th century Spanish galleon were discovered.

The *Beacon* is the flagship of Marine Archaeological Research, Ltd., based in Grand Cayman. The goal of the MAR expedition was the wreck of the *Nuestra Senora de la Maravilla*. The *Maravilla* went down in 1656 with a cargo in gold, silver, emeralds and religious objects valued at well over $1 billion.

Working under an exclusive search and recovery contract with the Bahamian government, MAR found the galleon's remains in 30 feet of water on the Little Bahama Bank. The preliminary salvage work accomplished so far has recovered treasure worth in excess of $1 million.

At the time of its loss, the *Maravilla* was carrying a Spanish admiral, more than 650 people, and a cargo worth no less that $1.6 billion in present-day value. That amount includes the documented cargo, along with an estimated 30 percent more in smuggled treasure and contraband. The *Maravilla* is widely acknowledged by maritime historians to be the second most valuable shipwreck ever to have occurred in the Western Hemisphere.

Divers have already recovered a rich and varied assortment of artifacts and treasure, including one of the largest Columbian emeralds ever found on a Spanish shipwreck—a perfect gemstone weighing nearly 50 carats.

Of the material recovered from the treasure ship, three-fourths will become the property of MAR and be brought to the Cayman Islands. Under the terms of the company's legal and binding contract with the Bahamian government, the remaining 25 percent will be retained by the Bahamas. MAR's share of the artifacts and treasure will be placed on exhibit at the company's Maritime History and Sunken Treasure Museum, presently under construction on Grand Cayman. The division of the treasure is scheduled to coincide with the museum's opening early this year.

The *Maravilla* salvage is the most recent research project undertaken by MAR. Expeditions to the Caribbean and Central America are being planned.

CAVE WARNING SIGN

The National Association for Cave Diving has reinstated its warning sign program, initiated during the early 1970s. Created by Parker A. Turner, NACD safe-

ty officer, the "new" NACD warning sign emphasizes the importance of quality training before attempting to dive the "overhead environment." Made of heavy duty fiber board, these colorful yellow, red and black signs are very useful tools for scuba classrooms, dive stores and their customers, and dive club meetings.

To order your sign, send $12.95 (plus 65¢ Florida sales tax for Florida residents) to National Association for Cave Diving, Post Office Box 14492, Gainesville, Florida 32604. The cost includes shipping and handling. For more information call (904) 877-8196.

A new NACD administration took office recently. It includes: president—Steve Gerrard, Tallahassee, FL; vice-president—Ken Watkins, Orange City, FL; secretary-treasure—Judy Bauer, Gainesville, FL; instructor board of directors—Paul Heinerth, Hudson, FL; board member—George Bortnyk, Seminole, Florida.

Additionally, Milledge Murphey, Ph.D. has been appointed NACD training director. Dr. Murphey is a faculty member at College of Health and Human Performance and is director of the Scuba Program at the University of Florida.

TREASURE NEWSLETTER

Fisher Research Laboratory, the world's oldest metal detector company, has published its latest edition of Fisher World Treasure News. The 12 page newspaper-style periodical features the


$25,000 ring found with metal detector

Diver makes hobby pay off big.

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For a free copy write to: Fisher Research Laboratory, Dept. SD, 1005 I Street, Los Banos, CA 93635-4398.

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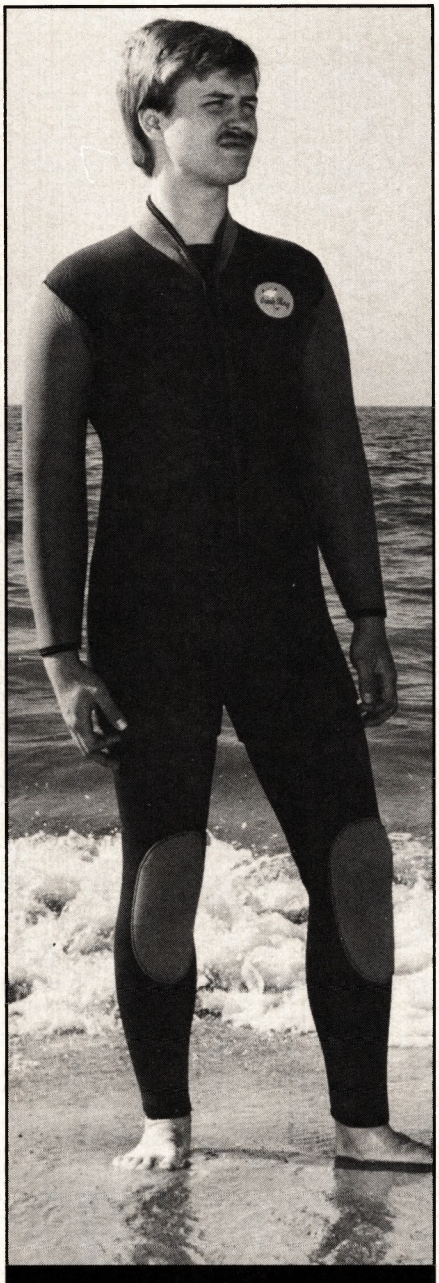
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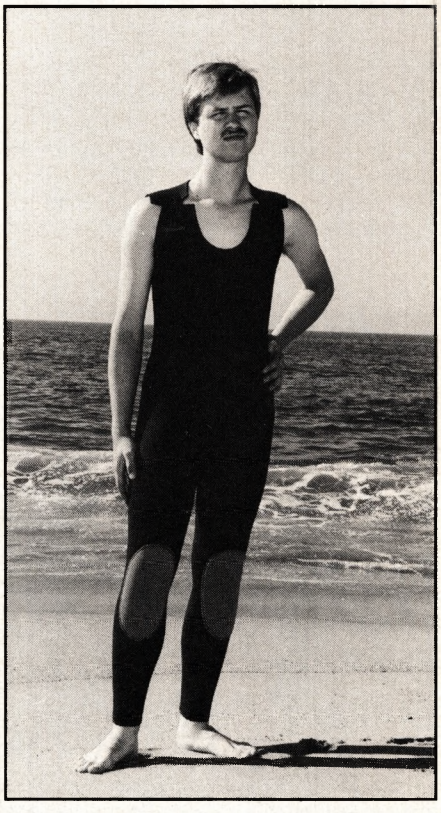


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TEXT AND PHOTOGRAPHY BY BONNIE J. CARDONE

When all is said and done, the major function of a wetsuit is to keep you warm. Finding one that does this, as well as being comfortable *and* inexpensive, would make many of us ecstatic. Well, this article is about just such a suit. Called the Ocean Ray, it comes in three versions. Shown here is the one-quarter inch nylon two Farmer John Step-in. The top-of-the-line model, it sells for just $174.95. Ocean Ray suits don't come in colors to match the most flamboyant nudibranch you've ever seen, nor can you special order one custom made to fulfill your most fantastic fantasy. However, if you want a quiet, sensible wetsuit—at an extremely economical price—this just might be the one for you.



Kirk Goltermann models the Ocean Ray Farmer John Step-in. This extremely sensible wetsuit comes in navy blue. The pants have Velcro closing shoulders.

The Ocean Ray is made of super flexible neoprene with nylon both inside and out. The farmer johns close at the shoulders with Velcro. They are navy blue with royal blue knee pads. Special features include a spine pad for warmth; gusseted crotch for comfort; and stretchy, sewn-on seam tape on the bottom of the legs for durability. There is a minimum of seams, something that will be appreciated by those who spend a maximum amount of time wearing this suit.

Both the men's and women's Step-in models feature a step-in jacket. The women's has French cut legs; the men's has short legs. They both have a heavy duty YKK Vislon zipper up the front, gus-

seted underarms for ease of movement and a high collar for warmth. The torso of the jackets is navy blue, the collar and arms are royal blue. In addition, the women's jacket has attractive accent panels of royal blue on each side. All edges are covered with stretchy, sewn-on seam tape. The jackets can be worn without the pants in tropical waters.

SKIN DIVER tested the Ocean Ray on several dives in California waters, known for their chill. The suit was very comfortable and warm. The nylon inside allows it to slip on and off easily.

The Ocean Ray suits are also available in Deluxe and Regular versions, in both one-quarter and one-eighth inch neoprene nylon two. Instead of step-in jackets, these models have Velcro closing beavertails. Both the men's and the women's Deluxe suits sell for only $159.95. The no-frills Regular models are just $134.95. These are Deluxe suits minus kneepads, spine pads and seam tape. All of the Ocean Ray suits are available in six sizes: S, M, L, XL, XXL and XXXL. They are generously cut; although I usually wear a medium, the small Ocean Ray suit was a much better fit. Hoods, booties, mitts and gloves that match the wetsuits are also available. You can get a color brochure listing all of the company's products—for free—by writing: Ocean Ray Wetsuits, 289-G, Suburban Avenue, Deer Park, New York 11729 or calling (800) 645-5554; in New York, (516) 667-7249.

CONTRIBUTORS NEEDED FOR SHIPWRECK BOOK

Author and publisher Robert F. Burgess (*Divers' Guide to Old Shipwrecks of Florida's Southeast Coast; They Found Treasure; Florida's Golden Galleons* and other books) would like to hear from possible contributors to a new book he is writing about found treasure—shipwreck treasure or interesting artifacts found by divers or beachcombers with or without the aid of metal detectors.

The incidents must be factual and fully describe the event, the find and the make and model of any detector used. If possible, include photographs. Since this book may be used as a source book for buyers and sellers of such items, please include the asking price of the artifact.

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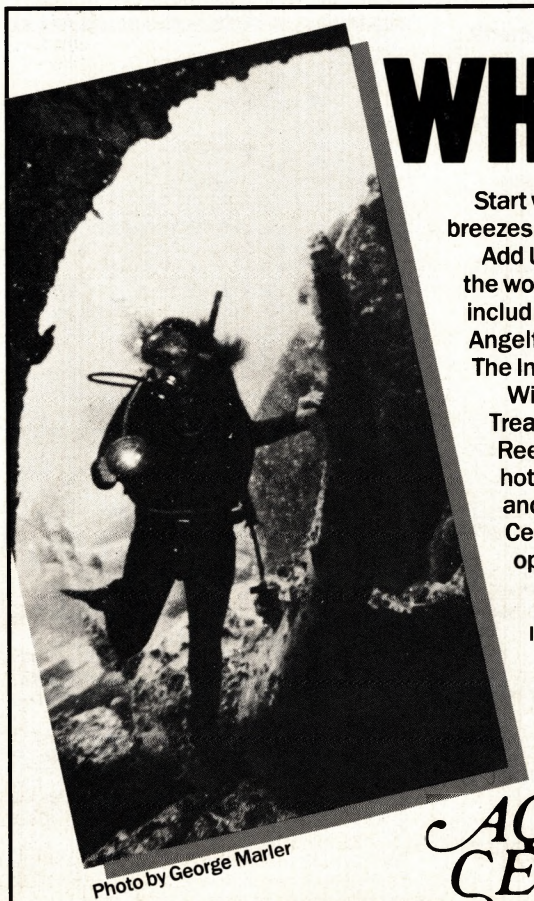


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I Learned About Diving From That

The Cold Realities Of Personal Limitations

TEXT AND PHOTOGRAPHY BY MARK LAWRENCE

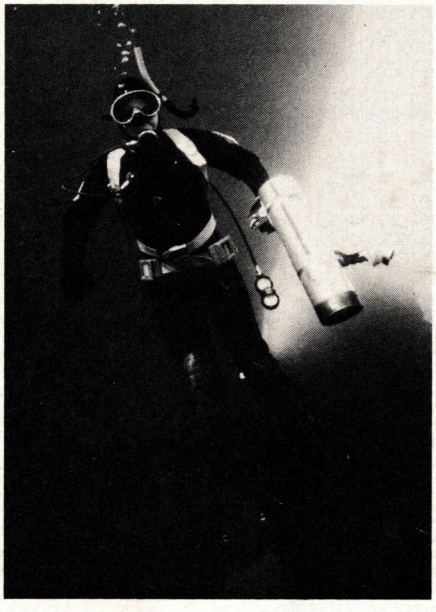
Newfoundland is not known for its scorching sun. It is, however, ruggedly beautiful. Every spring capelin come to this Canadian isle to spawn. In frenzied waves, the mating fish tumble ashore to lay their eggs. People fill buckets with these small smelts; sea birds fill their stomachs. Beneath the surface the dense schools lead an even more hazardous life. To coincide with the shoreward rush of the capelin, many predators have, over the millennium, altered their migratory routes and schedules. Codfish grow fat. Whales congregate. While pursuing the schools of capelin in the turbid water near the shallow beachfronts, humpbacks accidentally blunder into cod traps. All too often, such disasters cost the Newfoundland fishermen thousands of dollars in ruined netting and the whales pay with their lives. Fortunately, some small groups form during the annual spawning season to try and rescue the drowning animals and simultaneously salvage the fragile hardware.

When I was asked by John Stoneman to join a crew that planned on filming these events, I answered enthusiastically, "Yes." By the time I arrived in Trinity Bay, the main crew had established camp. Gale force winds kept us ashore for most of the first of our two allotted weeks. After the winds and seas subsided, we spent the next few days making several drysuit dives on local wrecks and grounded icebergs. Although we had intended that our trip would synchronize with the predicted height of the capelin spawning activity, we hadn't planned on unusual Arctic currents to depress the nearshore ocean temperature. The capelin were late; the water was too cold. Despite one-quarter inch, three finger mitts, in as little as one-half hour our hands became almost useless. Immersion brought on burning sensations that gradually faded to dull headaches along the edges of the sealing hoods. Our longest dive lasted about one hour; it was also my coldest.

Our project for that fateful dive was to film an old coal freighter in Trinity's harbor. A 20 minute inspection revealed the wreck remained remarkably intact. Suppressing a growing listlessness, I swam the length of the vessel several times searching for interesting vignettes. Once, to steady myself, I reached out blindly to the kelp shrouded bridge. When I started to close my grip, I sensed that I had mistakenly grabbed onto something jagged. Instinctively pulling my hand away, I drifted against the hull. No one noticed my clumsiness and I managed to wing off a few more shots before my buddy indicated his desire to go up. After exchanging signals we began our ascent.

On the surface I set myself up for the freeze. When the chase boat came alongside, they asked if we were too cold yet. My partner replied unhesitatingly, "Yes." Responding with a casual negative brought me a request to return to the freighter to obtain a tracking shot from bow to stern. I agreed.

As I settled on the bottom, I knew that not only was I cold, tired and alone, but I was also away from the small wreck. What seemed like a long and labored search in reality only took five minutes. Hanging onto the bow, I took the meter readings and forced my complaining fingers to reposition the focus and aperture settings on the camera. As I began my first traverse of the wreck, I cautiously stayed above the ship. I kept the swaying kelp well out of the central picture area. In the dim light and low visibility, when I just skimmed through the tops of the growth, the shot looked dramatic. On my



second run, just as I made the forward hold, I hit the hatch with my left thigh—instant cold. The skin on my leg turned numb. As the thermal underwear quickly absorbed the icy water, it became heavy and dense. That, combined with the loss of air from the bottom half of my drysuit, caused me to drop to the deck. Inspecting my thigh, I was relieved to find that only my suit was cut. Air percolated out of the eight inch gash. Trying to determine what I should do next, as the cold-induced stupor slowly fogged my thinking, I knelt on the tilted deck. Indecision and confusion accompany hypothermia. For some reason, rather than ascend, I chose to redo the shot. Heading toward the bow, I swam and inflated my suit simultaneously. My next attempt at tracking from the bow to the stern went much smoother. Because of my horizontal body position, as I kicked along, filming the shipwreck, I gradually lost my buoyancy again and in the process I managed to flood my other leg. Looking up from the bottom, I remember dully realizing that it was going to be a tough 30 feet. Shivers came in convulsive sets. I pushed my inflator and tried to kick my cramped legs.

At the surface, when the boat crew drew alongside, all I could say to them was that I'd torn my suit. I may have been dumb enough to return to the wreck alone and tired, but at least I knew enough to ask for help. Many hands reached down. After taking the motion picture camera from me, they stripped off my tank. My unresponsive fingers couldn't undo my belt. Lead and all, the boatmen pulled me onto the inflatable. As water spilled out of my suit across the decking, I gathered myself together. I recall sitting hunched over gazing at my rigid hands. Back at the town pier, it was Per-Inge Schei who walked me back to the parked vans. Although I tried to say that I was all right, I found it difficult to speak intelligibly. Per pushed a hot mug of soup into my hands. I welcomed the warmth. After the group had returned to their duties, Per undid the main drysuit zipper and helped me out of the wet clothing. That day I had arrived at the location by boat; my dry clothes were back at camp. Now Trinity, Newfoundland may not have been a major North American metropolis, but it was large enough to supply curious onlookers whenever strangers arrive, especially if they pull up to the pier with van loads of scuba and film equipment. In the middle of the dock, paying no attention to the townsfolk, Per peeled off layer after layer of his clothing and put them on me. He gave up everything but his swimsuit. As the cold mist began to fall, he poured me another mug of hot soup. Gradually I began to warm up. Eventually, Per borrowed a raincoat.

I felt cold and stupid. With my past experiences I knew what the signs of hypothermia were. Yet, I had disregarded the warnings. Solo diving may have been a professional necessity at times, but this situation didn't merit the risks. My subsequent blunder into the wreck accented my earlier poor decisions. My worst judgement was to continue working with a torn drysuit. When hypothermia begins, it creeps. The colder the water, the faster the symptoms occur. I don't know what the sea's temperature was, but the capelin didn't really arrive en masse for another two weeks; the Bureau of Fisheries said the unseasonably cold nearshore water kept the schools away. I know I've learned to respect my limitations. Had it not been for the quick action of others, I could have been in much worse shape.

By the way, thanks Per.

SKIN DIVER VOL. 36 NO. 2

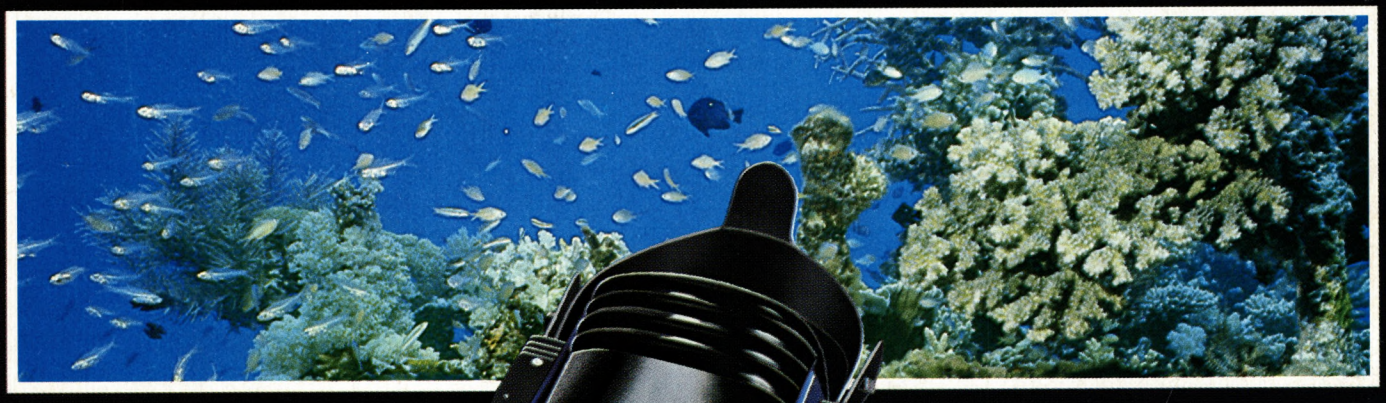
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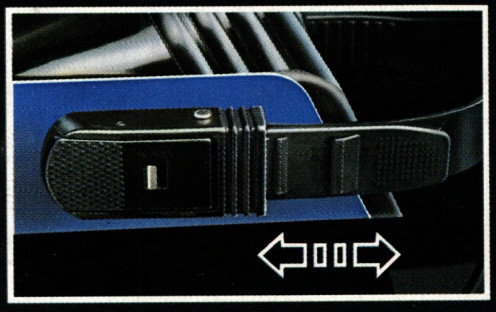
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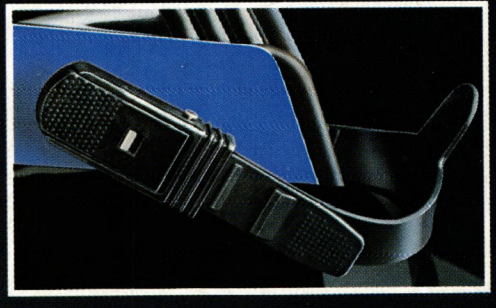
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